TECHNOLOGY DEPT.

APRIL, 1954

Telephone and Management Engineer

THE NATIONAL TELEPHONE MAGAZINE

Featuring In This Issue—

★ Telephone Uses of Power Tools, *by John S. Reed*
★ New Ideas Aid Job Performance, *by Myrle Shafer*
★ New Materials and Equipment, *by John G. Reynolds*
★ Traffic Force Assignment, *by Ruth E. Richards*

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TELEPHONE ENGINEER & MANAGEMENT

The National Telephone Magazine • Vol. 58, No. 4, April, 1954

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Feature Articles

★ Editorial — "Telling The World About The Independents" 31
★ Telephone Uses of Power Tools ..... John S. Reed 37
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FRONT COVER: Studying the intricacies of Automatic Toll Ticketing equipment are student-employes of General Telephone Co. of California. The new equipment to be placed in service next year in the Company's West Los Angeles and Santa Monica exchanges will provide direct dialing access for subscribers of the two areas to nearly every telephone in the Los Angeles extended area. Full-time courses are necessary to train technicians in the installation and maintenance of the automatic toll ticketing equipment. Standing, left to right, are IRWIN VANDERHEIDE, general equipment supervisor, B. E. DOTTER, general equipment instructor, LOUIS D. YARD, general plant manager, and STEPHEN McCARON, general equipment training supervisor.

INDEPENDENT TELEPHONES SERVE 2/3 USArea

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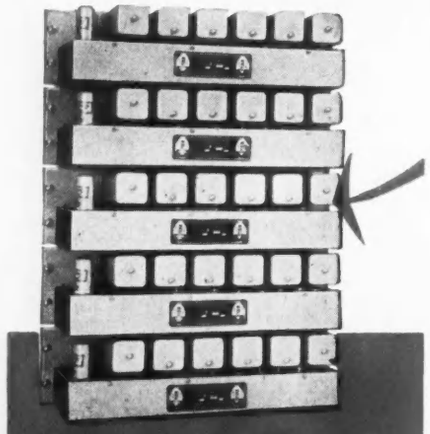
Deliveries now being made!



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Compiled from ideas sent in by members of National Office Management Association

272 pages, 6 x 9,
102 illustrations, $4.00

These short cuts have been tested in actual practice and proved successful in improving worker performance, saving time, boosting company profits. Included are such helps as —
— 42 *aids to better accounting*
— 38 *ways to simplify payroll procedures*
— 26 *ways to speed up typing operations*
— 17 *techniques for handling personnel problems*
— *and much, much more!*

Telephone Engineer Publishing Corp.,
7720 Sheridan Road, Chicago 26, Illinois

Mostly About People— Across The Editor's Desk

Executive Conference Opens May 10

LESS THAN A month until the Executive's Conference of USITA convenes at the Broadmoor in Colorado Springs, Colo. The program committee will have its work finished by the time you read this. Indications now point to another record breaker at this Spring conference and we hope to greet many friends there on May 10 and 11. We hope all of the state associations send delegates to this most important gathering of Independent telephone folks.

Roy Siemund Still Industry Member

WE ARE SURE that all of the many friends of *Roy W. Siemund* will be happy to know he has not severed all connections with our industry by his announcement of his resignation as president of the Leich Electric Co. and Leich Sales Corp. Roy is a member of the board of directors of these companies and informs us he hopes to attend a few of the telephone conventions in the future. The full story appears in another section of this issue.

Another Man-and-Wife Traveling Team

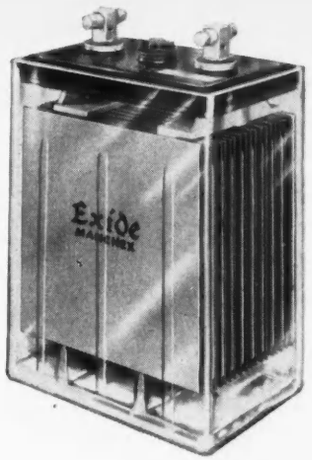
A FEW ISSUES ago we mentioned two couples who traveled together in their rounds selling the telephone industry. This time we are adding names to that list which are familiar to almost every telephone man in the United States. We refer to *Mr. and Mrs. Raymond Burfeind*. Since Mr. Burfeind's retirement from active duties with the Automatic Electric Co., Chicago, with whom he spent his business life, Mr. and Mrs. "Burf" have attended most of the state telephone conventions in charge of the Automatic exhibit. Many of these conventions are on a route which can be traveled by automobile and that is when Mrs. Burfeind comes along. Other times several of us from Chicago meet at airports or stations and use commercial transportation — at times both planes and trains must be used when the dates are conflicting and conventions are in different sections of the country. Burf is always there and does an outstanding job as host for the company he served for so many years.

Don C. Grammer Has New Address

SOME OF YOU old timers might remember *Don C. Grammer* when he was located in the Middle-West and worked in the Independent telephone industry. For the past 15 years Don has been working for our government in the Canal Zone. In a recent letter he asked us to say hello to his old friends. Effective January 11 he was moved from the Canal Zone to the Air Force Development Center at Rome, New York. Don's present address is Bldg. 136 — Apt. 2, Ringdale Court, Rome, N. Y.

USITA Advertising Campaign Started

ARE YOU A reader of TIME or U. S. NEWS & WORLD REPORTS? ? These two magazines will carry the opening advertisement of the campaign fostered and being financed by the Independent telephone industry and the manufacturers and suppliers to the industry through the *United States Independent Telephone Association*. We know you will feel quite proud of this effort to acquaint the American public of our Independent telephone companies. The USITA is now financing this program and we urge those of you that have not contributed to do so now. We will reproduce the advertisement carried in the two above named magazines in our May issue. The industry needs your financial assistance in this endeavor and needs it now! !



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IS YOUR BEST BUY IN TELEPHONE BATTERIES...LOW COST...DEPENDABLE ...MORE POWER IN LESS SPACE!

For every type of telephone service . . . for central office and private branch exchange equipment . . . for a standby source of power to insure service continuity . . . there are dependable Exide-Manchex batteries. Call your Exide engineer, he's an authority on batteries for your industry.

All have these five great virtues:

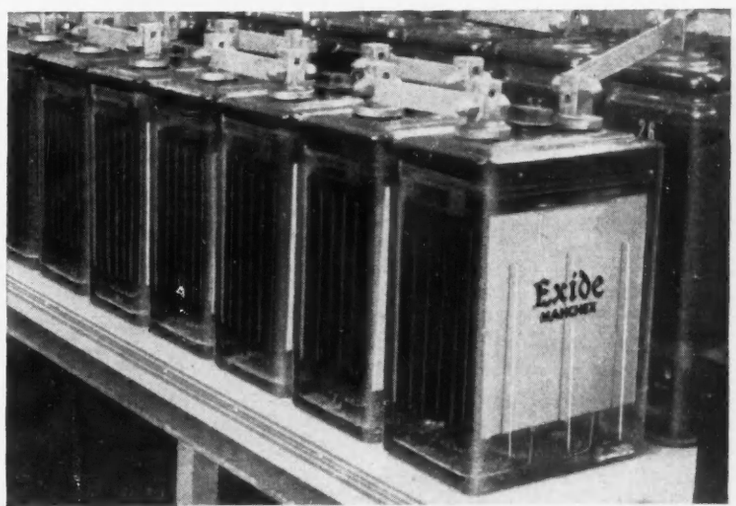
POSITIVE OPERATION — dependable performance for all telephone battery needs.

ADEQUATE RESERVE POWER—for emergencies beyond normal needs.

LOW MAINTENANCE COSTS—water is required about twice a year. No change of chemical solution needed during life of battery.

LOW DEPRECIATION—sturdy, long-life construction, including the exclusive manchester positive plates.

GREATER CAPACITY—avoids overcrowding of equipment.

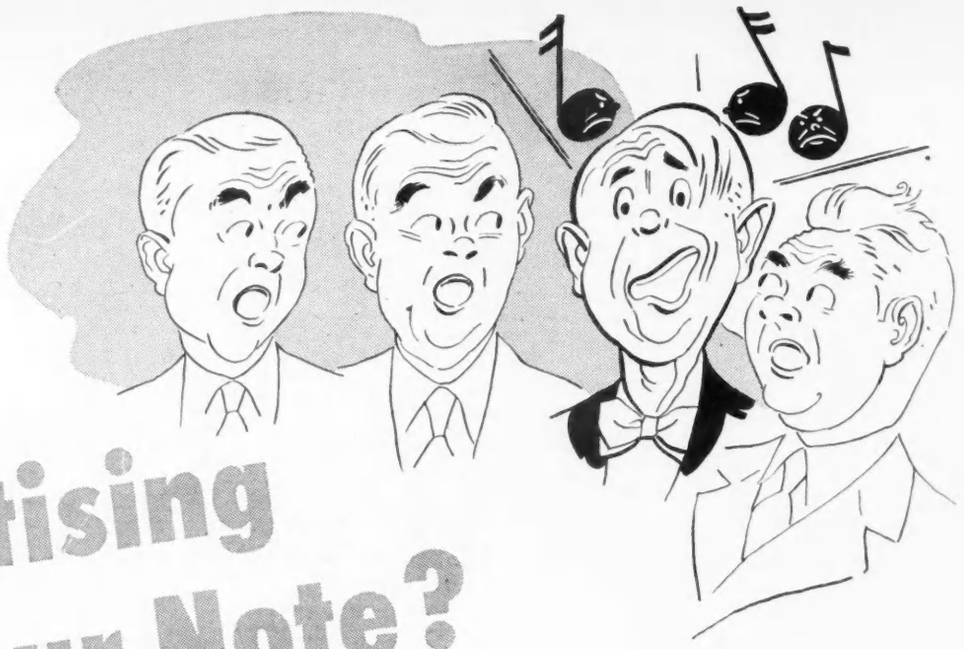


Inside an Exide-Manchex are these exclusive manchester positive plates. This is the heart of the battery . . . the source of power. Lead buttons are pressed into holes of the grid. Only a small portion of the total lead is formed initially into active material. The remainder is available for gradual conversion in service. For long battery life, a dependable source of power, order Exide-Manchex.

Exide INDUSTRIAL DIVISION

The Electric Storage Battery Company
Philadelphia 2, Pa.

Exide Batteries of Canada, Limited, Toronto



Is Advertising the Sour Note?

● Is the harmony of your telephone directory disturbed by advertising sour notes? That's not unusual as your service grows. Find out how to put advertising into perfect harmony with directory plans? Yes, directory advertising can be built up to a point important to profit. You are invited to consult with Loomis on your directory advertising problems. No obligation on your part, of course.

KNOW-HOW TO SOLVE YOUR DIRECTORY PROBLEMS

"Where to Call"

● 666 cities and towns in 20 states are served by the 234 directories that retain Loomis services.

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KANSAS CITY, MO.
810 Baltimore... HArrison 1270

PHILADELPHIA, PA.
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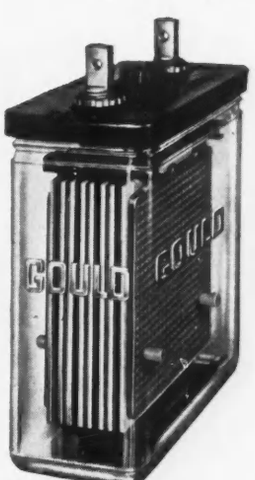
Plenty of Reserve Strength

THANKS TO BATTERY POWER!

When emergencies demand prolonged periods of continuous performance, there's nothing like Gould Planté! The PURE LEAD POSITIVE PLATES in these batteries constantly renew the active material. They are always ready, always at full capacity, with plenty of power in reserve. Gould Plantés last practically forever—are the lowest cost standby batteries you can buy!



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The Aristocrat of Stationary Batteries

GOULD *INDUSTRIAL BATTERIES*

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

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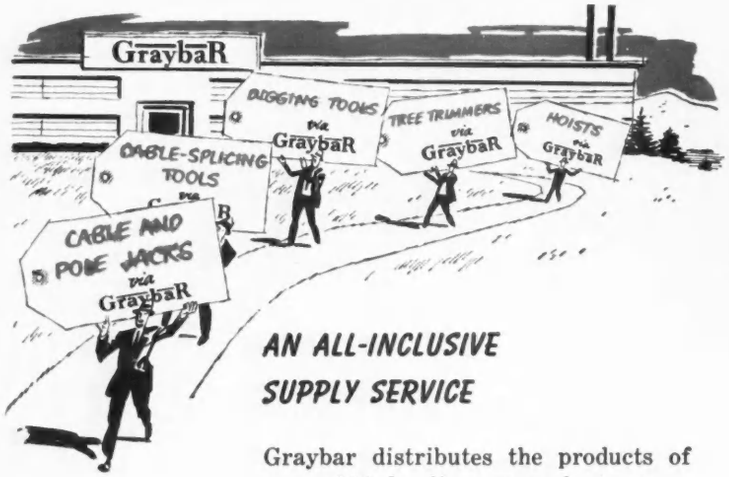
GraybaR TELEPHONE NEWS

WHEN CUTTING PLIERS WERE THE FIREMAN'S BEST FRIEND

Back in the days when city poles carried 100 to 200 telephone wires, firemen had a tough job just getting near a burning building. That's why cutting pliers became such an important piece of fire-fighting equipment. Old-time smoke-eaters simply placed a ladder against the barrier of wires and then cut away strand after strand until the ladder rested against the building. Rough on both phone company and pliers, but no problem for tools that bore the famous Klein trade mark. Since 1857 Graybar-distributed Klein tools of all kinds have reliably met the needs of linemen, electricians . . . and even firemen.

A SIX-TON SQUEEZE

The leverage provided by this bolt clipper produces over six tons of cutting pressure at the heel of the jaws—enough to slice easily through a ¼" annealed bolt. Larger types make quick work of bolts up to ¾".



AN ALL-INCLUSIVE SUPPLY SERVICE

Graybar distributes the products of over 200 leading manufacturers – among them many of the best-known tool brands . . . tools that linemen need, know, and respect. By ordering from this single source, you save purchasing paper-work and assure the *fastest possible* deliveries. Remember, your local Graybar Representative will be glad to assist at all times.

EVEN SOLID ROCK CAN'T STALL IT!

Thor ½" portable drills get *really* rough treatment from mining companies. Using carbide bits, Thor drills bite out 1¼" holes in solid rock without stalling – ample proof of the strength of the Thor motor and gearing . . . proof, too, of its ability to handle the toughest pole-line construction job. The complete line of portable Thor drills, saws, grinders, hammers, nibblers is distributed by Graybar. 209-224

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Executive Offices:
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Call Graybar first for...

IN OVER 100 PRINCIPAL CITIES

NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND Management
ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

Dear Sir: April 15, 1954

COURT HITS COMMISSION DENIAL OF RATE INCREASE:—Florida Railroad & Public Utilities Commission has no authority to issue orders in a rate proceeding dealing with inadequaate service, Florida Supreme Court has ruled, it was reported last month by National Association of Railroad & Utilities Commissioners. Florida's highest court concluded that commission did not have authority to deny increase in telephone rates because of allegations of poor service. It took action in connection with appeal by Florida Tel. Corp., Ocala, serving about 23,000 telephones.

In its decision, court pointed out that requested rate increase covered company's entire system, while complaint about inadequate service covered only about 15% of company's operations. Court commented, "Under our statutes the rate-making power should be exercised in one proceeding and the question of the adequacy or inadequacy of equipment, repairs, improvements, and service should be disposed of in another proceeding. While the legislature may have the power to change the law and provide for all such matters to be disposed of in one proceeding, it is beyond the power of the commission to change the law."

NOTAPHONE SEEKS FEE RULING:—Pointing out that hearings in FCC automatic answering & recording devices case were concluded nearly four years ago, & that it has been nearly two years since oral argument on initial decision in proceeding, Daphne Investment Trust, US distributors of Notaphone, last month asked Commission to issue decision as soon as possible. Daphne attorney Thomas N. Dowd said status quo is not being maintained during FCC consideration of matter, as Bell System companies can go ahead & install their own answering devices. All other parties, he declared, are "effectively precluded for marketing their respective instruments until and unless Commission makes finding to effect that present tariff provisions of Bell telephone companies are unreasonable."

NEWLY-ORGANIZED COOPERATIVES RECEIVE REA LOANS: — Two newly-organized farm telephone cooperatives received REA loan allocations last month, while another organization received its 4th loan, principally to provide for installation of automatic toll ticketing equipment & a toll testboard.

Valley Tel. Cooperative Assoc., Mound City, S. Dak., was allocated $528,000. Borrower plans to acquire access rights to 219 subscribers of Missouri Valley Tel. Co., & expects to add 680 new subscribers, operating through 5 dial central offices. It will build about 460 miles of new line.

In Colorado, Eastern Slope Rural Tel. Assoc., Limon, is buying 2 small companies serving 152 customers & 131 switching subscribers, & will add 195 new users. Colorado co-op received $337,000 allocation.

Lafourche Telephone Co., Golden Meadow, La., received $265,000 allocation as its 4th loan. REA loan allocations to company total $1,345,000. It is now operating 6 dial central offices, serving 1400 subscribers, over 180 miles of line. Automatic toll ticketing system is necessitated by toll volume exceeding original expectations, REA said, & will make possible toll dialing to a number of points, including New Orleans.

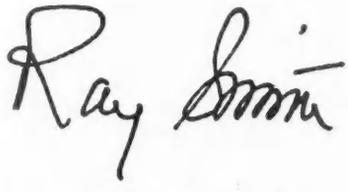
FREE TECHNICAL LITERATURE:—Six-page bulletin pictures & describes Coffing "Quik-Lift" Electric Hoists. For your copy, write Coffing Hoist Co., Danville, Ill.

RECENT OWNERSHIP CHANGES:—Stockholders of Algansee Tel. Co., Quincy, Mich., voted to dissolve company and turn property over to General Tel. Co. of Mich. . . . E. W. Kock, owner, Bushton (Kans.) Tel. Co. purchased Holyrod (Kans.) Tel. Co.

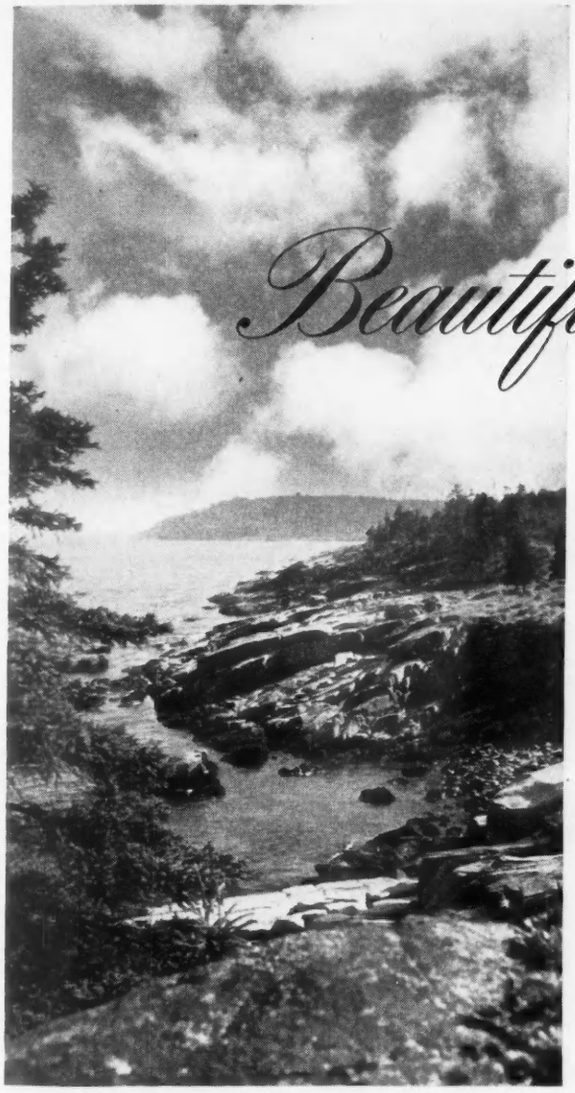
NEW INDIANA CO-OP GETS REA LOAN:—A newly-formed cooperative, Pulaski-White Rural Tel. Cooperative, Star City, Ind., last month was given $513,000 telephone loan allocation by Rural Electrification Administration. Organization will acquire 2 small Independents at Buffalo & Star City, serving about 500 subscribers, & expects to add 483 subscribers through REA-financed construction. It will operate 3 dial central offices.

HIGHLIGHTS:—Wellington (Ill.) Tel. Co. reorganized under name of Mutual Tel. Co. of Wellington. Maurice Lockart elected pres. . . . James Beery named pres. of newly incorporated Alger (Mich.) Associated Tel. Co. George Dunn appointed general mgr. . . . Donald C. Power, pres. General Tel Corp., New York City, elected to board of directors of General Public Service Corp. Carroll Nelson appointed mgr., Rural Tel. Service Co., Norton, Kans. . . . John J. McIntosh named vice pres. & general mgr. of Central Iowa Tel. Co,, Cedar Rapids . . . Bright (Ind.) Tel. Assoc. has discontinued operations. Former subscribers now receive service from Harrison (Ohio) Tel. Co. & Lawrenceburg, Ind. exchange of Southern Indiana Tel. Co., Inc. . . . Hudson (Ia.) Mutual Tel. Co., observed its 50th anniversary last month. George M. Strayer is pres.

DIED:—Edwin James Dalton, 72, manager of St. George (Kans.) Tel. Exchange, Feb. 27, after a month's illness.



Ray W. Smith, Editor



Beautiful COUNTRYSIDE—

BUT *bad* FOR TELEPHONE MEN

Off-shore islands, mountain ranges, wide rivers, deep canyons — these are a part of a great national panorama that often delights us. But to telephone men they can be an expensive headache.

Now you can bridge those gaps and make those extensions on your toll routes practically and *profitably* with Lenkurt Type 45BX Carrier System for use with radio equipment such as Lenkurt Type 72B.

The 45BX can be interconnected — on an *intermediate frequency* basis — to other 45-class carrier systems, requiring only inexpensive converters. And the miniaturized plug-in components and channel units of all these 45-class systems are interchangeable — for additional economy, convenience, and flexibility.

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- The number of channels that can be utilized depends on the modulation bandwidth of the radio system. A 48-channel system requires a spectrum of 40 to 264 kc, while a 24-channel system requires only 40 to 140 kc.

- An automatic channel regulator controls circuit net losses within less than 1 db.

- Adaptable to various signaling and dialing needs.

- Compandors are available with Type 45BX equipment for those situations where additional fade margin is indicated or other characteristics of the radio path and equipment make their use desirable.

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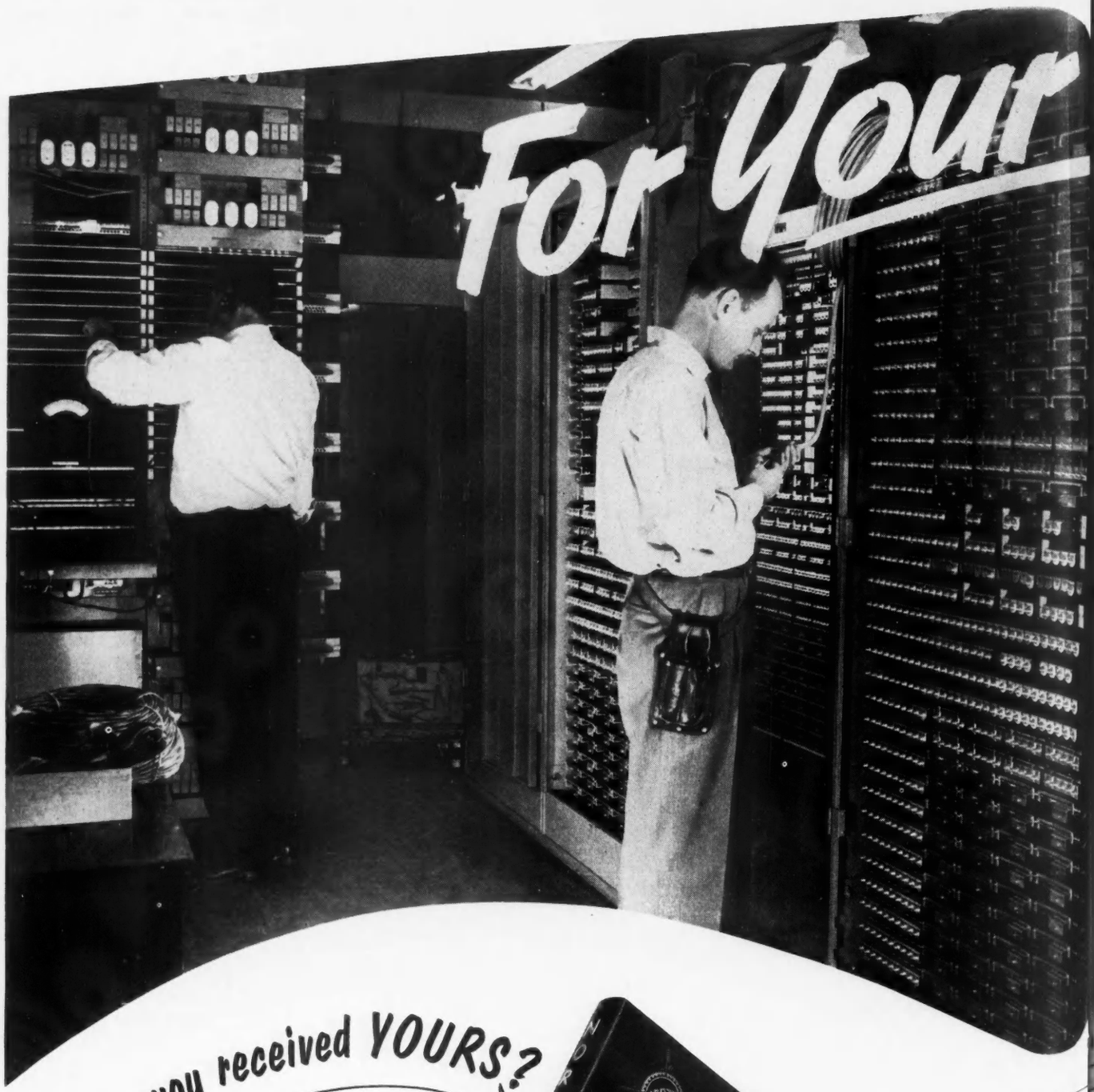

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There is a copy of this new fully illustrated, conveniently indexed North General Catalog No. 4 of Telephone Supplies and Equipment for the key people in every Independent Telephone organization. If your company has not received a copy, phone or write us now.

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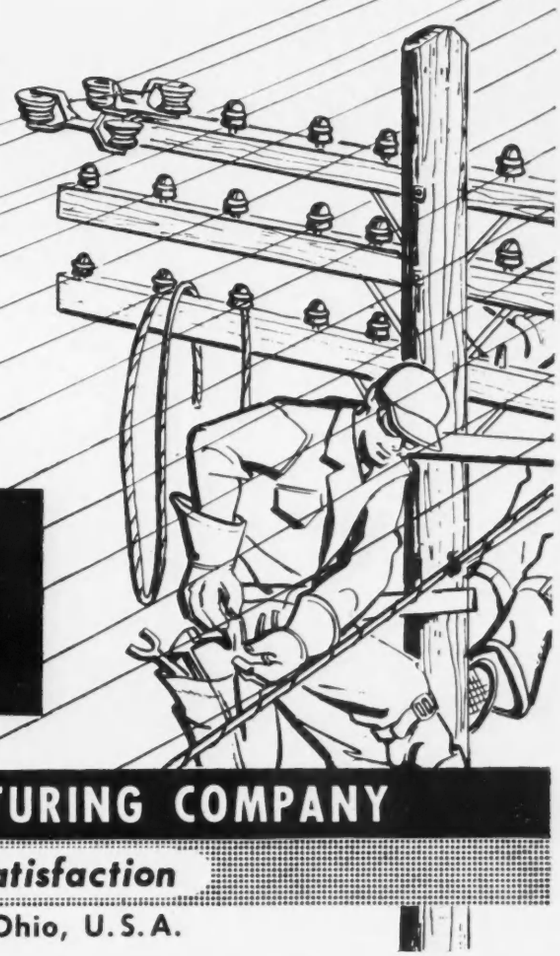
When the green light flashes for that next important construction project for your system, you can make your capital fund go farther, do more, if you give your bill of materials that "special treatment". Plan it early . . . let equipment and supplies experts help you . . . order everything from one qualified and dependable source.

Whether it be new switchboards, expanded trunking, modernization or additions to your outside plant, you can depend on the expert engineering consultation, the complete variety of essential items and the quality you get in dealing with North as *your* one source.

Start right on planning your next expansion of inside or outside plant. Get down that new, conveniently indexed North General Catalog, bearing in mind that

EVERYTHING IN TELEPHONE SUPPLIES AND EQUIPMENT can be purchased under one great time-tested name



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Thompson Broad Spectrum 2,4-D—2,4,5-T brush killers set a new standard for ease of application, more effective killing action and more economical results in brush clearance. Now your crews need no special technical skills—they simply mix and spray. Hard woods—all species—brush or weedy growth—powerful broad spectrum Thompson brush killers of controlled volatility remove the hazard of "chancey" effectiveness. Foliage spray or basal bark application, you get more kill per gallon and more gallons for your dollars.

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FIRST IN HEAVY-DUTY SALES 22ND STRAIGHT YEAR

For the 22nd straight year, men who know hauling costs have bought more heavy-duty INTERNATIONAL Trucks than any other make.

The reason is INTERNATIONAL *quality.* And cost records prove it. Operators' records show that INTERNATIONALS stay on the job longer . . . deliver more tons of payload for each dollar invested.

It will pay you to see your INTERNATIONAL Dealer or Branch. Let him show you how these built-for-the-job trucks can do a cost-lowering job for *you.* Time payments arranged.

INTERNATIONAL BUILDS AMERICA'S MOST COMPLETE TRUCK LINE

170 basic models from ½-ton pickups to 90,000 lbs. GVW off-highway models . . . including six-wheel, four-wheel drive, cab-forward and multi-stop delivery types . . . 29 engines from 100 to 356 hp., with widest choice of gasoline, LPG, or diesel power . . . wheelbases, transmissions and axle ratios for any need . . . thousands of variations for exact job specialization.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

Before you buy any truck remember **Cost-conscious Truck Operators Prefer INTERNATIONALS!**

International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

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The Universal Choice!

CALCULAGRAPH

Automatic Toll-time

CALCULATING and RECORDING

NEW TEN POSITION AUTOMATIC ELECTRIC CO. TOLL BOARD AT CALI, COLOMBIA, SOUTH AMERICA, HANDLES HEAVY TOLL TRAFFIC WITH THE AID OF CALCULAGRAPHS

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Calculagraphs are precision built machines. Available in several models, they can be easily installed in new equipment by your switchboard manufacturer or added to existing exchange installations.

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NOW - - - YOU CAN GET *Quickly*

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TRADE MARK

FROM THESE STRATEGICALLY-LOCATED WAREHOUSES

Legend

THESE DISTRIBUTORS CARRY STOCKS OF COPPERWELD TELEPHONE PRODUCTS AT LOCATIONS SHOWN ON MAP

- (A) Automatic Electric Sales Corporation
- (B) Buckeye Telephone and Supply Company
- (G) Graybar Electric Company, Inc.
- (K) Kellogg Switchboard and Supply Company
- (L) Leich Sales Corporation
- (N) North Electric Manufacturing Company
- (S) Stromberg-Carlson Company

AND SUPPLEMENTING THESE STOCKS—

- (C) Copperweld Steel Company Mill Warehouse

Call Your Copperweld Distributor for immediate delivery

Stocks of Copperweld* Telephone Products—the best materials for your outside plant—are warehoused by leading Distributors at strategic locations throughout the United States. This means that you can get the Copperweld Products you need when you need them. For quick delivery just call your Copperweld Distributor. He's ready to show you real service.

*Trade Mark

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION
Glassport, Pa.
For Export: Copperweld Steel International Company, New York

LINE WIRE

GUY AND MESSENGER STRAND

DROP WIRE

GRIP-FLEX INSULATOR TIES

GROUND RODS AND CLAMPS

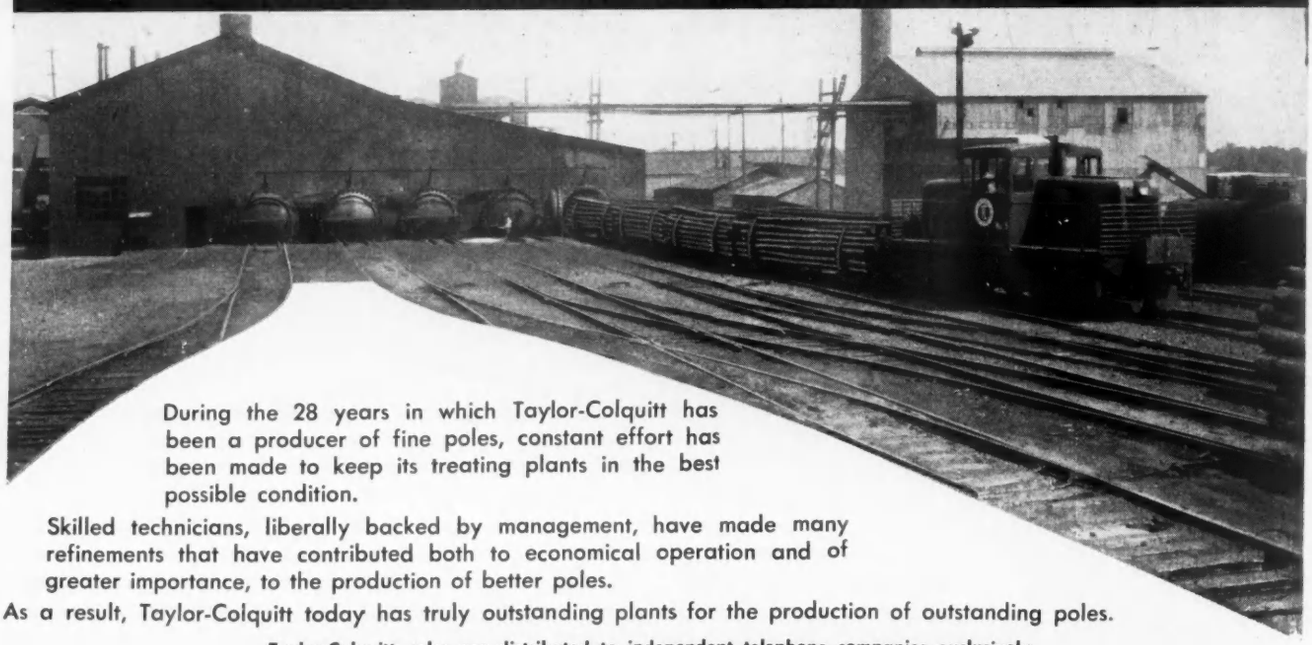
GOOD ENGINEERING DEMANDS THE BEST MATERIALS...

Copperweld TELEPHONE PRODUCTS

TRADE MARK

SOLD BY LEADING DISTRIBUTORS

POLES FROM TRULY OUTSTANDING PLANTS



During the 28 years in which Taylor-Colquitt has been a producer of fine poles, constant effort has been made to keep its treating plants in the best possible condition.

Skilled technicians, liberally backed by management, have made many refinements that have contributed both to economical operation and of greater importance, to the production of better poles.

As a result, Taylor-Colquitt today has truly outstanding plants for the production of outstanding poles.

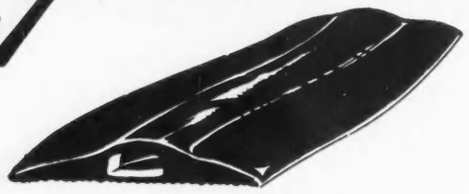
Taylor-Colquitt poles are distributed to independent telephone companies exclusively by Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7, Illinois

TAYLOR - COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

Do you know these facts about

FLEXIDUCT?



It's the new rubber floor duct that solves over-floor wiring problems quickly and effectively, with adequate protection from sweepers, mops and equipment on casters. Installation is easy and permanent. You just fasten Flexiduct in place with its own special cement. There's no drilling or necessity to use screws and fasteners. Flexiducts' flexibility allows it to adhere evenly and securely to all types of floor surfaces and it is adaptable for installations ranging from 2 conductors to 25 pair switchboard cables. Write for complete information regarding Flexiduct and your wiring problem today.

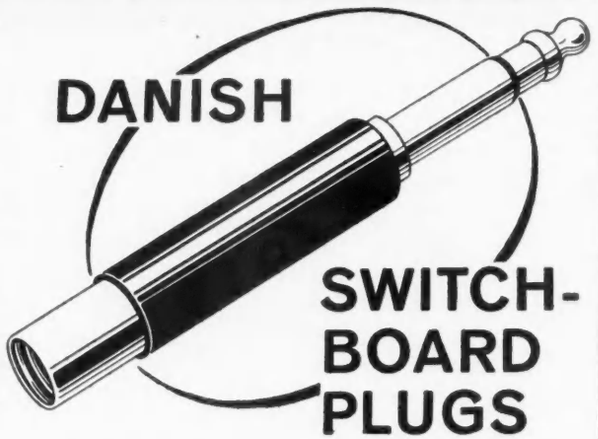
•

Export Agents | Ericsson Telephone Sales Corp.
100 Park Ave. New York 17, N.Y.

For further information, write for circular 753 A.

BUCKEYE TELEPHONE & SUPPLY COMPANY
1250 KINNEAR ROAD Kingswood 0655 COLUMBUS OHIO

DANISH SWITCH-BOARD PLUGS



The plastic insulation injected between the conductors stays solid. It covers the edge of the brass shell, positively preventing cause of most shorts. Invented and used exclusively by TELEFON FABRIK AUTOMATIC A/S since 1912. These plugs provide unsurpassed precision in machining, solidity of construction, and high insulation safety.

Available as replacements for all popular two-and three conductor plugs.

The most popular types are stocked by our sales distributors in U. S.

BUCKEYE
Telephone & Supply Co.
Columbus 6, Ohio

SUTTLE
Equipment Co.
Lawrenceville, Ill.

TELEFON FABRIK AUTOMATIC A/S
COPENHAGEN DENMARK

GENERAL CABLE

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

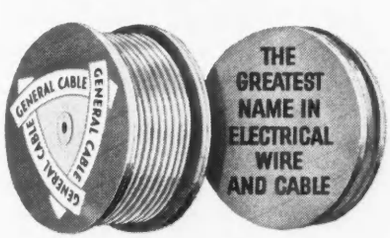
SUPERTEL*

OUTSIDE THERMOPLASTIC TELEPHONE CABLE

UNSURPASSED RELIABILITY

The smoother, more uniform and tougher outer jacket of SUPERTEL assures resistance to abrasion and bending as well as the deteriorating effects of sunlight, moisture, chemicals, high summer temperatures, flame and oils!

SUPERTEL combines light weight (for easy, economical installation) with the excellent transmission qualities that result from polyethylene insulation. Available in 19, 22 and 24 A.W.G., and up to 404 pairs in concentric and unit construction. Star quad, quads and composites are also available.



BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

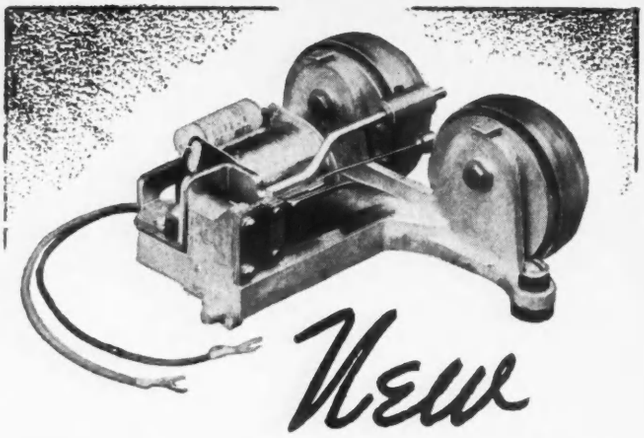
For information and service see our national distributors:

AUTOMATIC ELECTRIC SALES CORPORATION • Chicago, Ill.
LEICH SALES CORPORATION • Chicago, Ill.

*R.E.A. Approved

GENERAL CABLE CORPORATION

420 Lexington Ave., New York 17, New York • Sales Offices: Atlanta • Buffalo Cambridge (Mass.) • Chicago • Cleveland • Dallas • Detroit • Greensboro, N. C. Indianapolis • Kansas City • Los Angeles • Milwaukee • Minneapolis • Newark (N. J.) • New York • Philadelphia • Pittsburgh • Portland (Ore.) • Rossmoyne, Ohio (Cinn. Area) • St. Louis • San Francisco • Seattle • Syracuse • Tulsa • Washington, D. C.



New

HIGH IMPEDANCE RINGER GIVES OPERATING ECONOMY

For harmonic, synchromonic and decimonic frequencies

This new USI engineering approach contains all the outstanding basic features of the new Western Electric type C straight line ringer while making available equally superior multi-frequency ringers. USI ringers are especially designed for use in the new W.E. No. 591 sets to provide selective ringing in five frequencies in harmonic, decimonic or synchromonic series.

Economy: Since USI ringers are designed to operate on low currents with high impedances of approximately 100,000 Ohms at 400 cycles and 400,000 Ohms at 1000 cycles, many operating economies are possible. As many as ten ringers may be bridged on a single line. Costly trouble shooting, especially of marginal lines is reduced considerably.

Resonant Frequency is obtained by a new principle using a small clapper on a flexible arm to strike the gongs and a separate resonant weight on a vibrating arm to maintain resonance. This design, together with rugged construction, reduces maintenance costs to a minimum.

OTHER FEATURES...

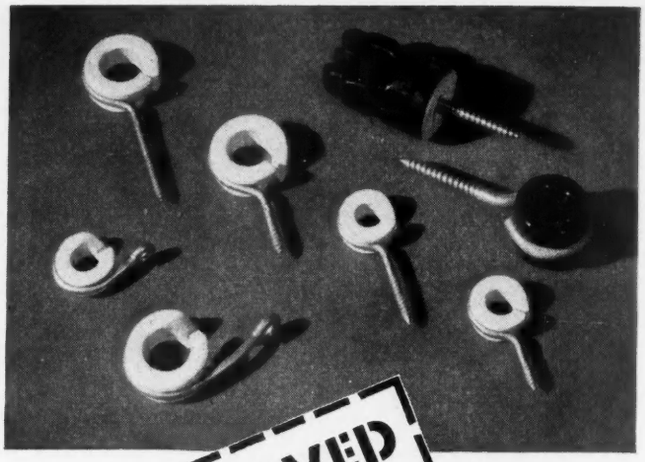
Stability of USI ringers during a long life – 200 hours continuous ringing.

Improved Ringing Tone of the new W.E. 500 type sets is maintained. A volume control operated by the subscriber is available if desired. Each ringer is a completely self-contained unit designed and constructed to perform in W.E. 591 sets without making any changes in the set itself. All ringers are completely adjusted at the factory to ring at the designated frequency. Only a screwdriver is needed to install the ringer in the W.E. 591 sets.

Ask for ringer folder. Write Dept. U.

UNITED STATES INSTRUMENT CORPORATION

SUMMIT, NEW JERSEY



APPROVED by The TELEPHONE INDUSTRY

***PORCELAIN PRODUCTS'* INSULATORS**

Dimensionally accurate to A. T. & T. specifications, these Porcelain Products' insulated screw eyes are specifically designed for the telephone industry. Strong, sturdy construction—for your customer satisfaction. Tough, smooth insulators—give longer more dependable service. Hot-dip galvanized screws—for easy installation. Write today for complete information.

60 years — *Porcelain Products, Inc.* — FINDLAY, OHIO — PP INC.

WHATEVER ITS SIZE

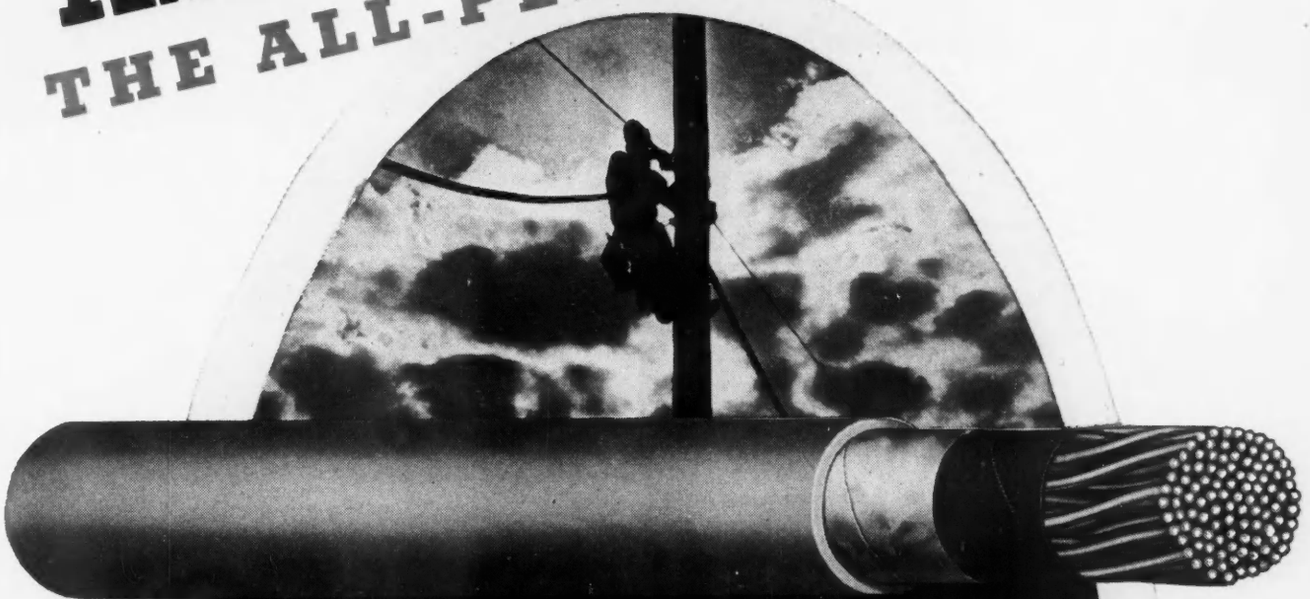
your directory will receive all of the skill and craftsmanship that goes into every piece of Donnelley printing.

The Lakeside Press

R. R. Donnelley & Sons Company

350 East Twenty-second Street, Chicago 16

ANSONIA
Ankoseal®
THE ALL-PLASTIC CABLE



LIGHTER WEIGHT

Ankoseal's lighter weight reduces the number of men, hours of labor, and materials required for installation. Use it on your next job.

Ankoseal also is —

ELECTRICALLY SUPERIOR
WATERPROOF
CHEMICAL RESISTANT
WEATHERPROOF

THE ANSONIA
WIRE & CABLE COMPANY
ANSONIA, CONNECTICUT • PHONE: ANSONIA 4-2306

Is More Proof

WIGHT PRESIDENT

ROBERT D GOTT SEC AND TREAS

The Wellington Telephone Company

ROBERT D GOTT MANAGER

Wellington, Ohio. February 25, 1954.

February 25, 1954

Kellogg Switchboard and Supply Company
79 West Monroe Street
Chicago 3, Illinois

Gentlemen:-

We have recently installed one of your new Kellogg Electronic Ringing Generators which provides synchromonic ringing power for our exchange of 2,050 stations of which 35% are rural stations.

From the first day that we placed the Kellogg Electronic Ringing Generator in service we have seen our trouble due to ringing power disappear and our service men report an excellent ring on all frequencies from all parts of our exchange.

We feel that in a very short time the Kellogg Electronic Ringing Generator will pay for itself from the savings on supervision and maintenance of a vibrator type ringing generator without taking into consideration the value of eliminating customer complaints due to ringing failure, weak ringing or ring-overs.

We wish to take this opportunity to commend the Kellogg people on the development of the Electronic Ringing Generator which solves one of the greatest problems of operating companies.

Very truly yours,

The Wellington Telephone Company

Robert D. Gott, Manager

WOOD COUNTY TELEPHONE COMPANY

110 EAST GRAND AVENUE

WISCONSIN RAPIDS, WISCONSIN

TELEPHONE 130

February 26, 1954

Kellogg Switchboard and Supply Company
79 West Monroe Street
Chicago 3, Illinois

Gentlemen:-

There has probably been no single piece of telephone equipment that has given us more genuine satisfaction than the new Kellogg Electronic Ringing Generator.

In December, 1952, we placed one of the early model machines in service at Wisconsin Rapids, Wisconsin. At that time, we had no idea as to the capacity of this equipment, and of course, no notion as to its reliability. At this writing - 14 months later - we can say that the original machine has performed with perfection during the entire period. We were somewhat dubious about the service life of the various tubes, but to date have not replaced a single tube.

This generator is handling the ringing requirements for 6,000 subscribers, and we are convinced that it is overworked at times. However, there is no visible indication to that effect.

We have recently purchased another Kellogg Electronic Ringing Generator for our Nekoosa, Wisconsin, exchange, and there is no doubt in our minds that these machines will continue to give perfect satisfaction at any telephone exchange where ringing requirements are involved.

We will be pleased to tell our story of satisfaction to anyone who may be interested.

Yours very truly,

WOOD COUNTY TELEPHONE COMPANY

H. B. Flower, General Manager

THE TELEPHONE SERVICE COMPANY OF OHIO

TEL NO 4-7711

LIMA, OHIO

REPORTS
APPRAISALS
ENGINEERING
CONSTRUCTION
MANAGEMENT

February 17, 1954

Mr. C. D. Manning, Vice President
Kellogg Switchboard and Supply Company
79 West Monroe Street
Chicago, Illinois

Dear Mr. Manning:

Please note our intention of extending a compliment to the people at Kellogg for the #101 Electronic ringing generator.

Our experience with this apparatus has been very satisfactory. We employ the five harmonic frequency units. Their compactness, ease of installation, minimum mounting space and reliability of operation give them preferred rating by all of our equipment personnel.

With best wishes for your continued success in the manufacture of telephone apparatus.

Yours very truly,

TELEPHONE SERVICE COMPANY OF OHIO

Frank T. Quatman
Assistant to the President

FTQ:s

LOS GATOS TELEPHONE COMPANY

TELEPHONE ELgato 4-9000
11 MONTEBELLO WAY
LOS GATOS, CALIFORNIA

February 24, 1954.

Kellogg Switchboard and Supply Company,
79 West Monroe Street,
Chicago 3, Illinois.

Gentlemen:

We are very much pleased with the operation of your new Kellogg Electronic Ringing Generator which we installed at our Novato Exchange on October 14, 1953. It has provided us with a much improved bell ringing performance. Routine maintenance has been reduced to practically zero, and it has been in continuous operation since the date of installation.

We desire to specify that this electronic ringing generator must be included in our new Kellogg crossbar office for our Novato Exchange.

Very truly yours,

LOS GATOS TELEPHONE COMPANY

Lyndon Farwell
President

f*Necessary?

KELLOGG
Electronic Ringing Generator

... the new equipment that supplies power electronically for all ringing frequencies

UNITED TELEPHONE COMPANY, INC.

Warsaw, Indiana

February 26, 1954

Mr. Allen S. Johnson,
Kellogg Switchboard & Supply Company
79 West Monroe Street
Chicago 3, Illinois

Dear Mr. Johnson:-

Your letter of February 19, 1954 addressed to our office at Knox, Indiana has been forwarded to our Warsaw office for reply. The letter refers to the new Kellogg Electronic Ringing Generator which you manufacture.

Our experience with the Electronic Ringing Generator in Knox, Indiana has been very satisfactory and on the strength of its performance we have on order a duplicate of the Knox order for our exchange at Columbia City, Indiana. We also have on order one Electronic Ringing Generator for our exchange at Wolcott, Indiana where we are converting to dial and are using your Federal Step by Step equipment. The Electronic Ringing Generator was made a part of the original specifications for this equipment.

We are ordering in a few days an additional Electronic Ringing Generator for our Exchange at Portland, Indiana where we are converting from two-party city service to four-party city service and 10-party rural full selective divided circuit ringing.

Our Engineering and Circuit Department especially recommend this equipment where we have in service long rural cables subject to ringing inductance noise.

We would be very glad to show these machines to any of your prospective customers who may be interested in this type of ringing equipment.

Very truly yours,

R. E. Daniel

R. E. Daniel, Chief Engineer

RED:pjg

Earns *More* than Approval from the Field!

The Decision is Unanimous! . . . Kellogg's *Electronic Ringing Generator* consistently earns the complete approval of practical telephone men. Letter after letter from presidents, general managers and chief engineers —men best qualified to judge results—report exceptional ringing performance on harmonic, synchromonic or decimonic frequencies. New economy, efficiency and utmost ease of maintenance constantly rate their highest praise. But that's not all! As these same experienced men begin modernization of other Exchanges, Kellogg *Electronic Ringing Generators* are invariably included in their plans . . . final, positive proof of complete approval in the field!

*These letters of genuine approval are typical of the enthusiastic endorsements Kellogg is receiving daily from Electronic Ringing Generator customers. Names of users in your territory available on request. Write for bulletin.

KELLOGG — DIVISION OF IT&T

KELLOGG SWITCHBOARD AND SUPPLY COMPANY
A Division of International Telephone and Telegraph Corporation
SALES OFFICES: 79 West Monroe Street, Chicago 3, Illinois

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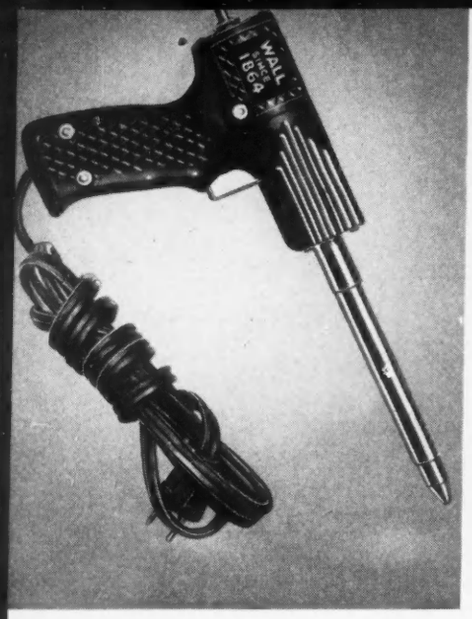
6000 W. 51st Street, Chicago 38, Illinois, REliance 5-5445
4501 Truman Road, Kansas City 1, Missouri, HUmboldt 7085
410 N. Syndicate Avenue, "Midway Area", St. Paul, Minnesota, Nestor 5878
1515 Turtle Creek Blvd., Dallas 2, Texas, Prospect 6207
1663 Mission Street, San Francisco 3, California, Market 1-6011
1555 West Fourth Street, Mansfield, Ohio, Mansfield 7146-6

KELLOGG BRANCH OFFICES:

406 S. Main Street, Los Angeles 13, California, Vandyke 6759
720 S. Washington Street, Portland 5, Oregon, Atwater 8559
157 Chambers Street, New York 7, New York, BEekman 3-8505

EXPORT DISTRIBUTORS:

International Standard Electric Corporation
50 Church Street, New York 7, New York



New and Different! –TRIG-R-HEAT Soldering Gun heats instantly on AC or DC—requires no transformer. Gun has built-in light and a 6″ reach—weighs only 12 oz. Equipped with ¼″ Iron Clad Tip, has wattage range of 400-150. P. WALL MFG. CO.

•

Standard in the Telephone Field for transposing wires at the Cross Arm. The No. J8286 "Point" Transposition Bracket is made of high carbon steel—will stand any stress. CB-Insulator Pin, also standard, now available for prompt delivery. JOSLYN.

Your Battery Problems Are Solved when you put Gould Plante′ and Flote′ Batteries to work. Unique features of design cut maintenance and charging costs, lengthen life and reduce replacements. Made by GOULD-NATIONAL BATTERIES, INC.

•

Added Versatility. For use with plastic cable, S-20V Cable Terminal is made with 2 cable entrances, when 1 cable is required, pipe plug is inserted in other entrance. Order couplings and plugs later to conform to cable layout. COOK ELECTRIC COMPANY.

Save Three Ways . . . on materials, man-hours, and maintenance with INDIANA STEEL & WIRE CO.'s Crapo HTL-85 and HTL-135 Line Wire. Galvanized by the famous Crapo Galvanizing Process, protected with heavy, ductile coating of zinc

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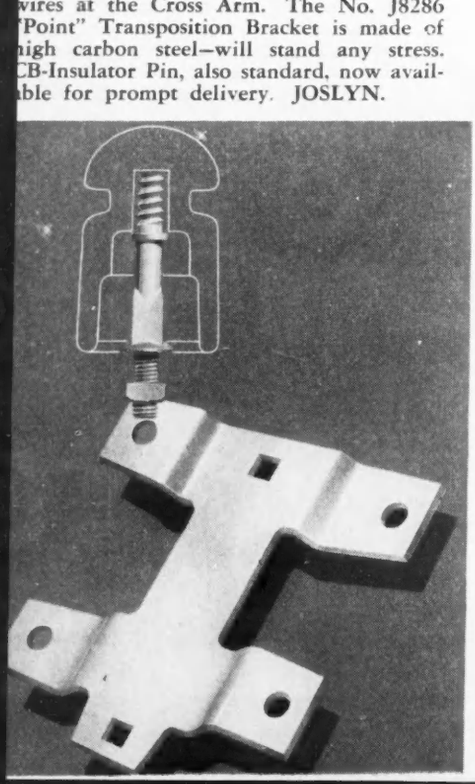
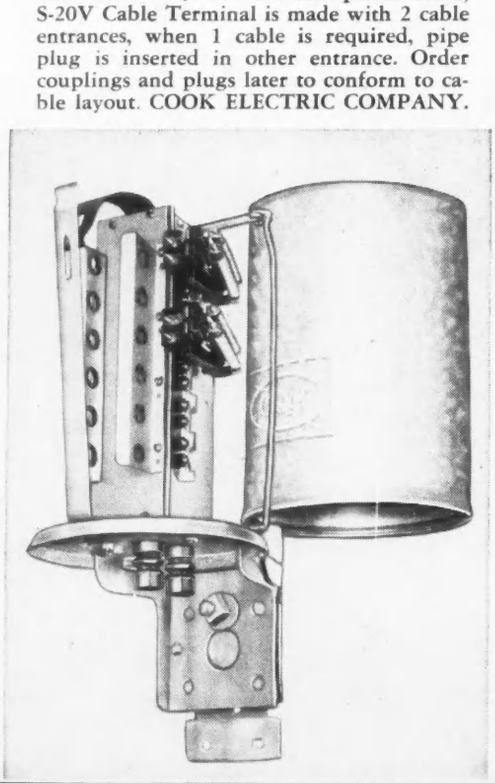
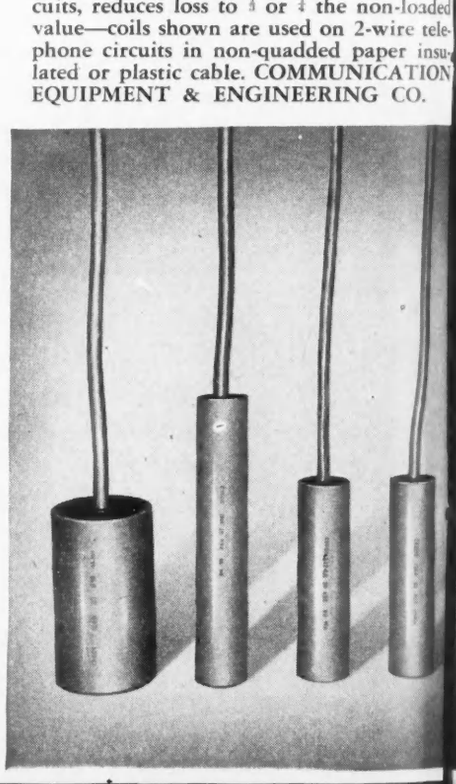
Application of Loading Coils on telephone circuits, reduces loss to ½ or ¼ the non-loaded value—coils shown are used on 2-wire telephone circuits in non-quadded paper insulated or plastic cable. COMMUNICATION EQUIPMENT & ENGINEERING CO.







Send Your Next Order for Supplies To:

KELLOGG

DIVISION OF IT&T

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

A Division of International Telephone and Telegraph Corporation

***Sales Offices:* 79 W. Monroe St., Chicago 3, Ill.**

BRANCH WAREHOUSES AND OFFICES:

6000 W. 51st Street
Chicago 38, Illinois

410 N. Syndicate Avenue
"Midway Area"
St. Paul, Minnesota

1663 Mission Street
San Francisco 3, California

4501 Truman Road
Kansas City 1, Missouri

1515 Turtle Creek Blvd.
Dallas 2, Texas

1555 West Fourth Street
Mansfield, Ohio

BRANCH OFFICES:

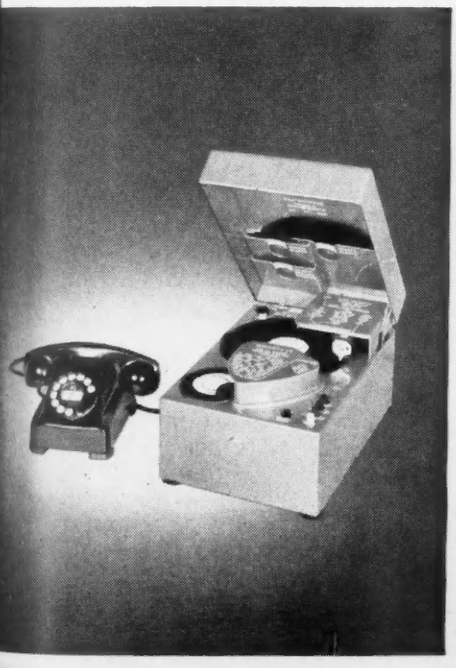
406 S. Main Street
Los Angeles 13, Calif.

720 S. W. Washington Street
Portland 5, Oregon

These Double-Faced Signs are made of long-life porcelain enamel fused to heavy gauge steel. Clear visibility and permanent colors are features of signs made by INGRAM-RICHARDSON MANUFACTURING CO. With either plain or activated surface.

•

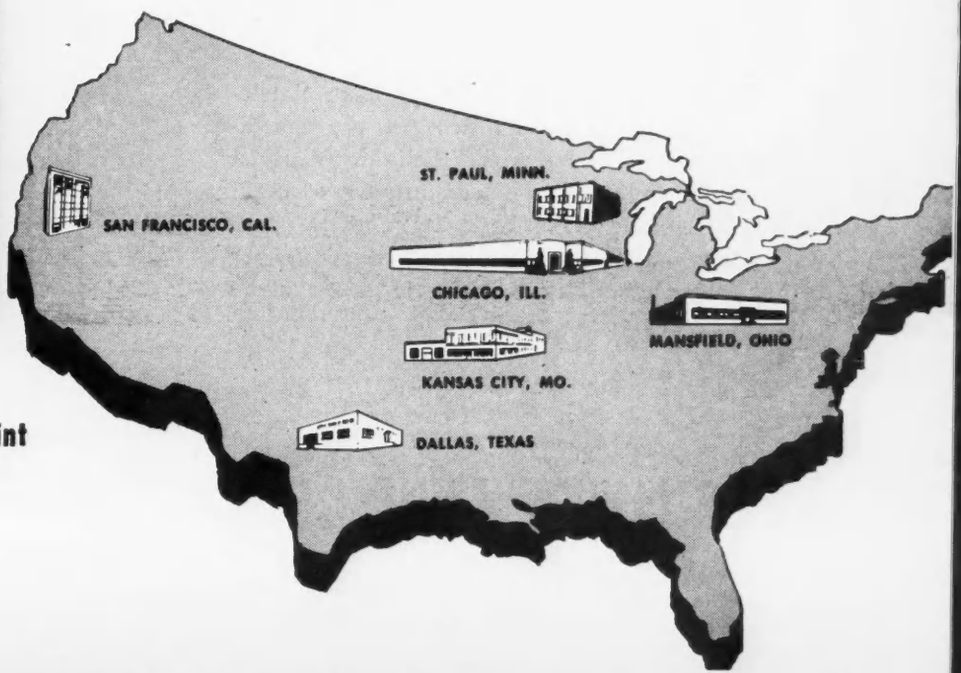
Permanently Recorded Meesages made on Peatrophone automatic telephone answering instrument can be identified and filed for future reference in an ordinary letter file. 8" disc takes over 130 incoming messages. Talk-out disc can be re-used indefinitely.



KELLOGG

HEADQUARTERS FOR SUPPLIES

You will save time and shipping costs and get guaranteed quality when you make Kellogg your only source for Line Supplies. Delivery service is fast—Kellogg has 6 conveniently located warehouses and more than 100 supplier distribution points throughout the country. Your order is shipped from the location nearest you.



Your Nearest Kellogg Shipping Point Is Never Far Away!

This druggist was frantic when working alone ...

Now he's calm and efficient with PEATROPHONE

We nominate the American druggist as one of the unsung heroes of our land — but at the same time suggest that Peatrophone telephone answering service would be more helpful to him than a bronze plaque.

Our druggist today is expected to run a prescription department, an ice cream parlor, a cosmetic shop, a candy store, a library and a specialty shop. He's expected to run a telephone order service too — and in rush hours it's next to impossible to satisfy store customers and telephone customers too.

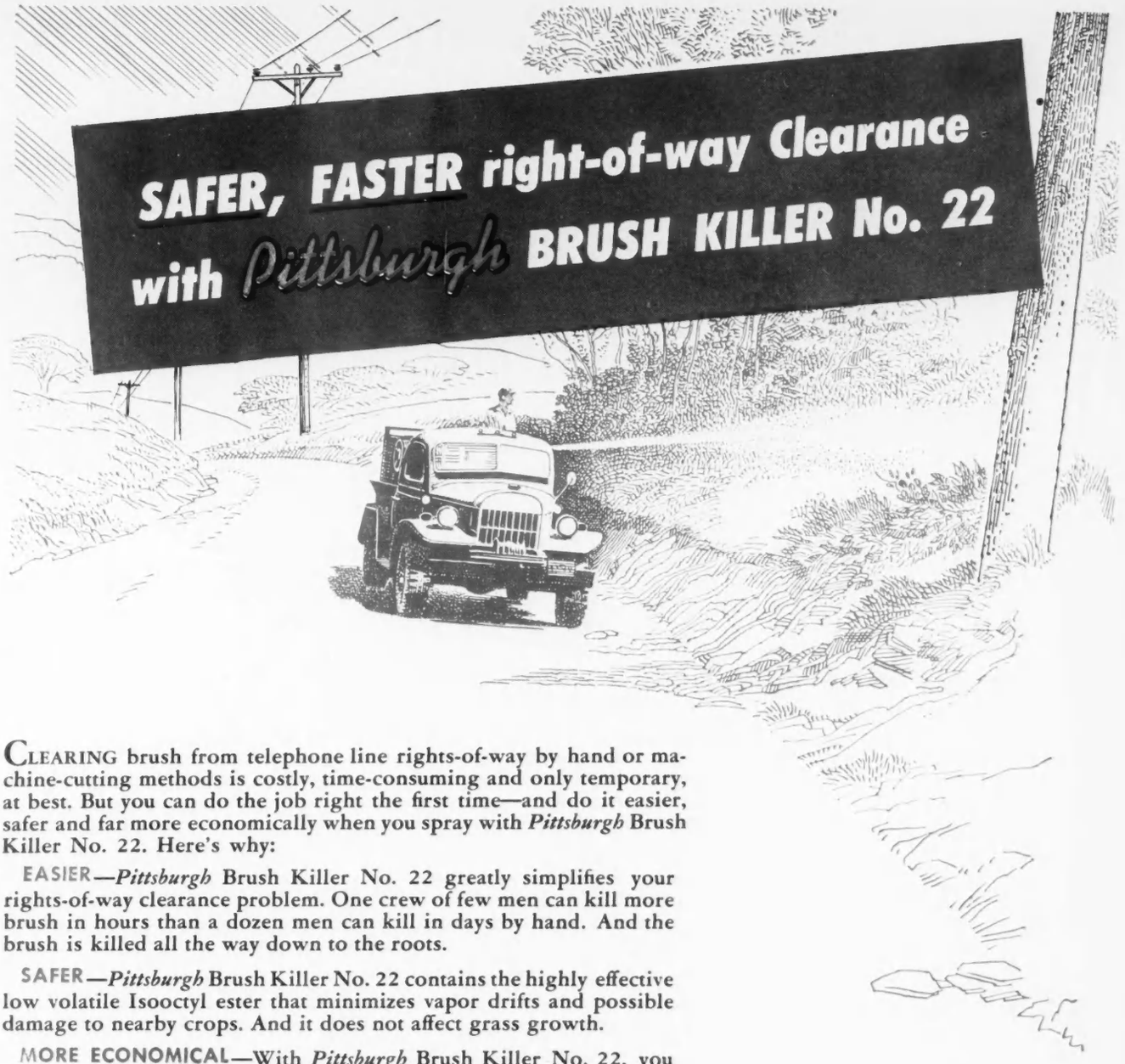
Because Peatrophone answers this problem of telephone calls during busy hours, druggists are immediately interested in the service. Tell any druggist that when the store is busy he need only flip a switch to have Peatrophone answer every call and take messages — and *you will have a prospective subscriber for Peatrophone service.* Then tell the druggist that he can play back the messages and fill the phone orders as soon as he is free — and *you will have an order for a Peatrophone rental!*

Call on the druggists today — give them Peatrophone's prescription for the most economical and efficient way to keep telephone customers happy — and *you will open up a new source of revenue for your company.*

Write today for complete information and literature on Peatrophone — your new source of revenue. Note: Selective harmonic ringing subsets now available — all frequencies.

TELEPHONE ANSWERING & RECORDING CORP.
342 Madison Ave. New York 17, N. Y.

SAFER, FASTER right-of-way Clearance with *Pittsburgh* BRUSH KILLER No. 22

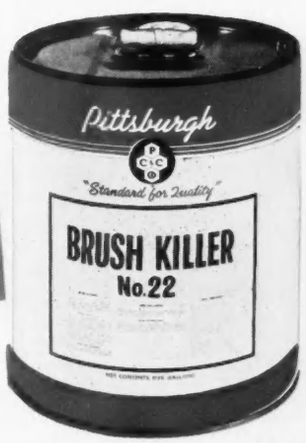


CLEARING brush from telephone line rights-of-way by hand or machine-cutting methods is costly, time-consuming and only temporary, at best. But you can do the job right the first time—and do it easier, safer and far more economically when you spray with *Pittsburgh* Brush Killer No. 22. Here's why:

EASIER—*Pittsburgh* Brush Killer No. 22 greatly simplifies your rights-of-way clearance problem. One crew of few men can kill more brush in hours than a dozen men can kill in days by hand. And the brush is killed all the way down to the roots.

SAFER—*Pittsburgh* Brush Killer No. 22 contains the highly effective low volatile Isooctyl ester that minimizes vapor drifts and possible damage to nearby crops. And it does not affect grass growth.

MORE ECONOMICAL—With *Pittsburgh* Brush Killer No. 22, you can clear your rights-of-way at far less cost per mile than by hand or mechanical methods. And cleared rights-of-way enable your maintenance crews to cover more miles per day, with savings in labor and equipment. ● Write today for complete details on *Pittsburgh* Brush Killer No. 22.



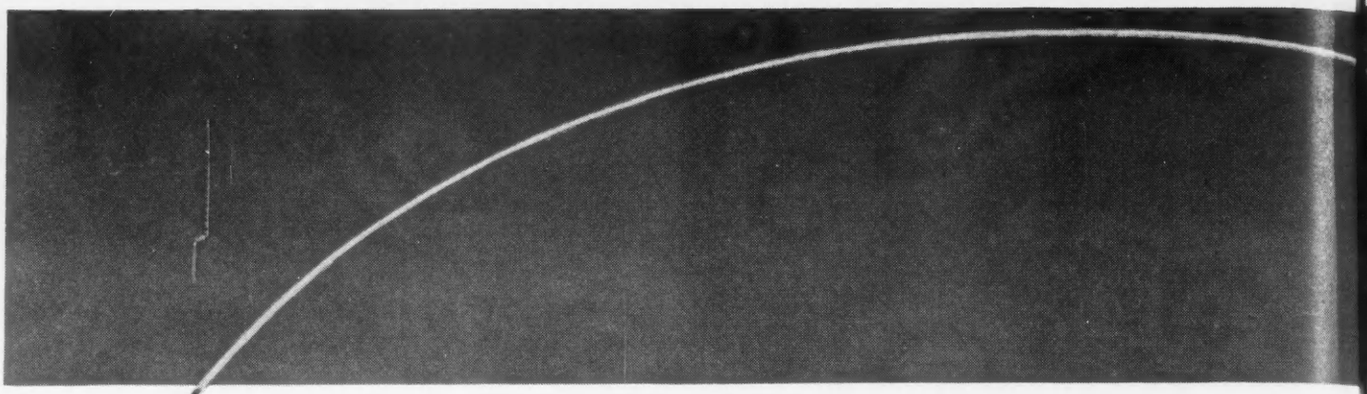
Standard for Quality

"GraybaR" QUALITY SINCE 1869 *REG U.S. PAT OFF
Distributed by GraybaR ELECTRIC COMPANY

AGRICULTURAL CHEMICALS DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

W&D 5095

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

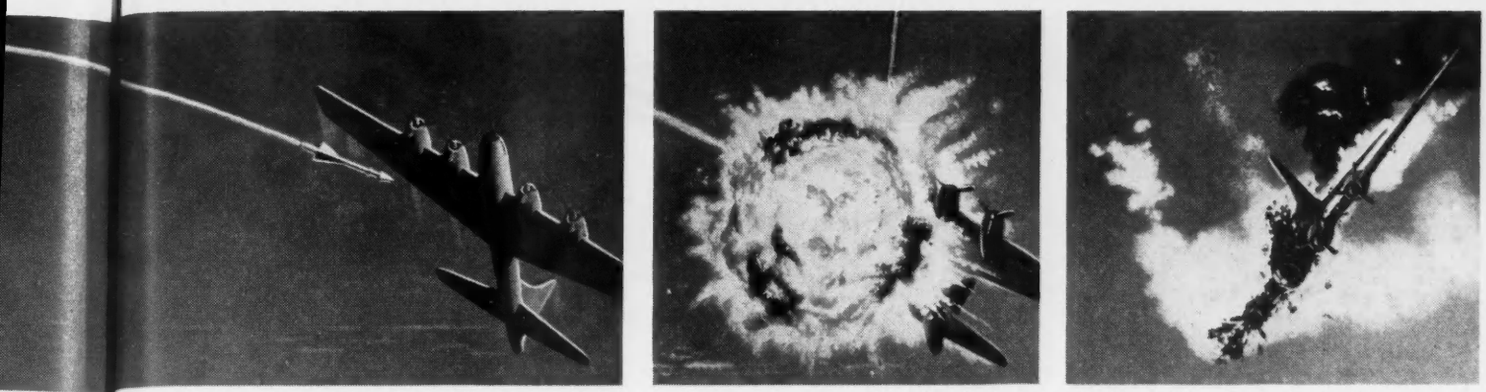


Service to the Nation

Western Electric's chief job is, of course, to manufacture and supply dependable equipment at low cost for the Bell System.

Years of close cooperation with Bell Laboratories in designing and making complex electronic equipment for Bell System operating companies gave us the special skills needed to take on one of the most dramatic jobs in our 85-year history.

On the opposite page is the story of that job — a job done, like many others we've undertaken, at the request of Uncle Sam. It is through ads like this that we try to let the public know we serve the nation *two* ways.



Drawings based on high speed motion pictures show Nike's missile destroying a pilotless bomber in test at the Army's White Sands Proving Ground, N. M.

Winged Victory... product of telephone wizardry

This is the story of NIKE (ny'key)—named after the Winged Goddess of Victory of ancient Greek mythology.

But today's Nike is no myth! It's one of Uncle Sam's most fantastic new defense weapons—proved in tests and now being delivered to the Army by Western Electric, maker of your Bell telephone.

Nike is the first system in production for keeping anti-aircraft guided missiles under constant automatic control from the ground, enabling them to track down and destroy any existing type of plane, regardless of its speed, no matter how high it flies, what evasive action it takes.

You'd find Nike's brain filling several large vans with complex electronic equipment. Signaled by an air warning net that hostile planes are approaching, Nike picks up the target and tracks it electronically. With incredible speed and accuracy, Nike pinpoints a plane's position—tracks it relentlessly—tells when

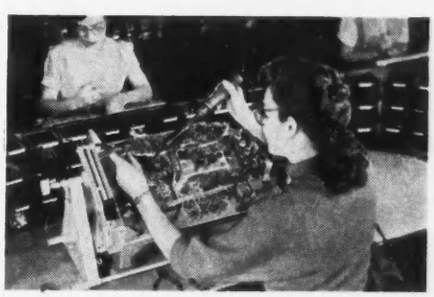
Inside central control van, these soldiers watch radarscopes as Nike automatically guides a missile to its target.

to launch the missile—follows the missile's flight—and guides it to the target at supersonic speed. Then . . . *the kill!*

Such a weapon may seem wholly unrelated to your familiar friend the telephone—which doesn't look complex. But the telephone you hold in your hand is connected with a maze of intricate mechanisms in which electronics plays a mighty part.

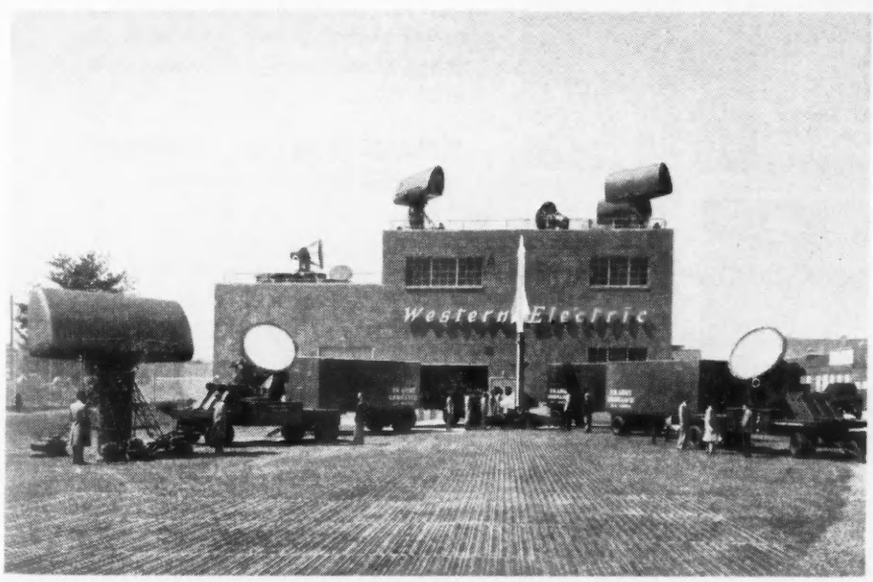
Special skills and techniques developed jointly by Western Electric, manufacturing unit of the Bell System, and Bell Telephone Laboratories, our teammate in creating the nation-wide telephone network, were just what were needed to transform Nike from an idea to a combat-ready reality.

Working closely with Bell Laboratories, the Army, Douglas Aircraft (which is responsible for the missile itself), and with hundreds of sub-contractors, Western Electric has applied its unique ability in electronic technology to producing a mighty weapon of defense. In this achievement, Western Electric—



A Western Electric girl assembles one of the more than 300 "brain cells" that guide a Nike battery's missiles.

like all the Bell telephone companies—is continuing to carry out the Bell System's guiding principle: "*Service to the Nation in Peace and War.*"

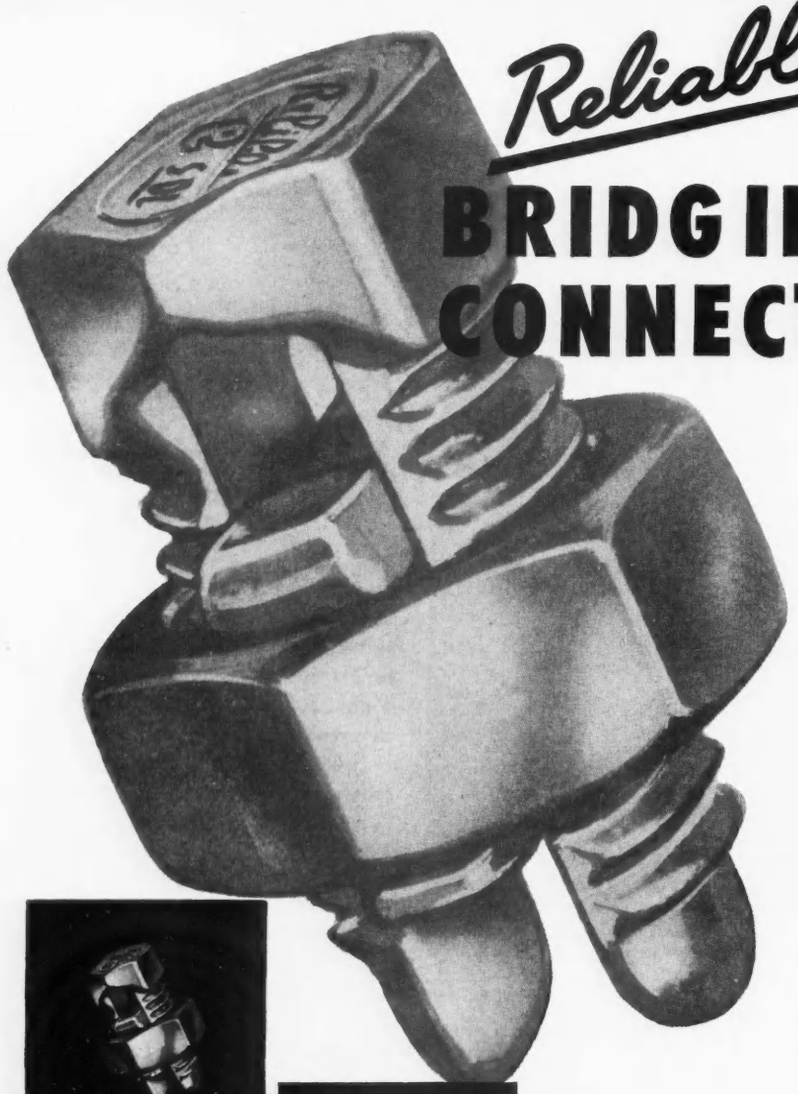


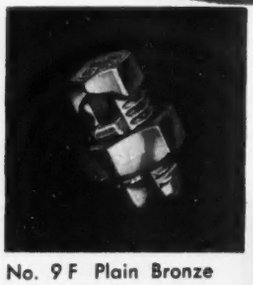
Principal units of Nike anti-aircraft guided missile system are shown here grouped in front of Western Electric test building.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

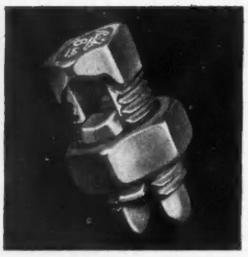
Reliable BRIDGING CONNECTORS



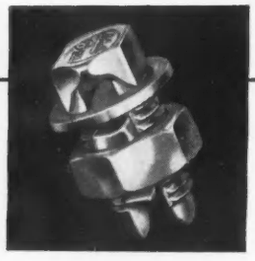


No. 9 F Plain Bronze
No. 9 FG Plated Bronze

No. 9 FB
Plain with Washer
No. 9 FGB
Plated with Washer



No. 8 F
Plain Bronze
No. 8 FG
Plated Bronze



No. 8 FB
Plain with Washer
No. 8 FGB
Plated with Washer

WHEN YOU BUY BRIDGING CONNECTORS—

you should be sure they are forged, close grained and designed with an eye on minute details. You should be sure all edges and corners are rounded and sure that you will get accurate threads for permanent high pressure connections.

You can order from Reliable and get all these things. You can order them plated and with or without spacers — however you wish them.

RELIABLE ELECTRIC COMPANY
3145 Carroll Avenue
Chicago 12, Illinois

Reliable

Telephone Protective and Terminal Equipment for all Station, Line and Central Office Needs.

OVER 45 YEARS' SERVICE TO THE UTILITIES

Telling the World About the Independents

A number of Independent telephone operating companies and Independent manufacturers and suppliers have joined to finance a comprehensive program of advertising and other publicity for the purpose of making it known to the public at large that there is such a thing as the Independent segment of the telephone industry, and how important that segment is to the telephone system of this country.

This advertising program will be conducted under the auspices of the United States Independent Telephone Association. It has been carefully thought out and planned by professional advertising experts working in close cooperation with a Task Force of USITA composed of long experienced and forward-looking Independent telephone men.

Funds in the neighborhood of $200,000 have been or are being provided for the first year of this campaign, which will get under way in May.

All those who are officially concerned with this advertising campaign — including, of course, the USITA Task Force, which has been working on this proposition for more than a year — and many other Independent telephone people who have studied the matter. are convinced that this undertaking will be of great value, in a number of ways, to the Independent segment of the telephone industry. They believe this value will be as certain to small Independent telephone companies as to the larger companies and groups.

For many years the situation of the Independent part of the telephone industry, from the standpoint of public knowledge of and about it, has been unique. Relatively few people outside the business have realized the size and scope of this Independent industry, and it is a fact that many people have not known that it exists at all.

This situation has been a handicap to the growth, prestige and other situations of the Independent industry.

It has been a handicap in such matters as legislation. As one veteran of the Independent field has said: "Before you can convince legislators that proposed legislation is bad for the Independent companies, you have to convince them that there are such things as Independent companies."

It has been a handicap, specifically, in financing, and consequently in the growth of Independent companies for the purpose of meeting public demands for service in the areas in which they operate.

It has been a handicap, also, in a number of other ways — such as, for instance, the proposition of bringing new and permanent personnel into Independent companies.

The growth of most Independent telephone companies has been rapid since World War II, and indications are that it will continue to be rapid if these companies can obtain the necessary financing for it. That this national advertising campaign will be of tremendous help in that direction is, we think, a certainty.

Provisions are made, in the plan, for cooperation with and by Independent companies desiring to do local advertising of the same character. This work will be carried on through the cooperation of the Telephone Advertising Institute.

The start of the national advertising campaign will be with advertisements in high-class national magazines such as "Time," "U. S. News & World Report" and "Country Gentleman."

Those handling the program are gratified at the number of small Independent telephone companies that have taken financial participation in it. These funds have not only helped to make the program more comprehensive, and therefore more effective, but their receipt has also shown that these smaller companies are alert to the benefit all Independent companies will receive from this undertaking.

To all of which we say "Amen!" And we think that we could perhaps have selected a better title for this editorial.

We think the title could fittingly have been: "The Independent Telephone Industry Comes Of Age."

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ANNOUNCING

Stromberg-Carl

Central exchange operates in same manner as in all-wire telephone systems. SETCO channeling equipment provides the connection to Microwave for incoming *and* outgoing calls.

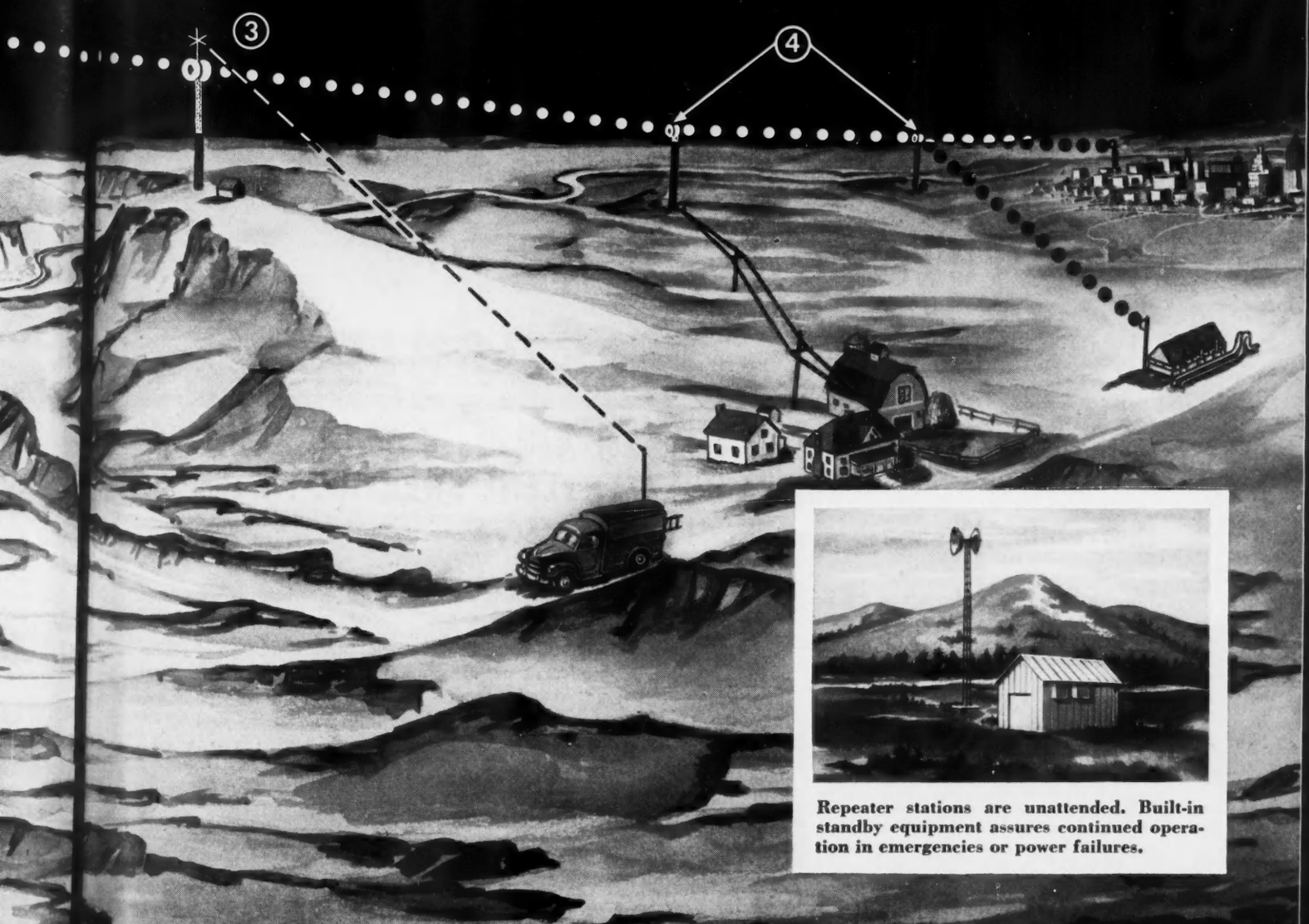
Now . . . a Telephone Microwave Relay System backed by 60 years of telephone experience

If your company's short-haul traffic problems include difficult terrain, expensive maintenance of lines for toll or inter-exchange circuits, weather hazards, expansion of service into suburban areas, military establishments or new industrial plants—then Stromberg-Carlson telephone *Microwave* is the perfect solution.

Stromberg-Carlson has served your industry for sixty years; its engineers, production technicians and sales representatives understand how best to fit this "wireless" system into your present and future needs.

rlson Microwave

A POLE-LINE IN THE SKY!



Repeater stations are unattended. Built-in standby equipment assures continued operation in emergencies or power failures.

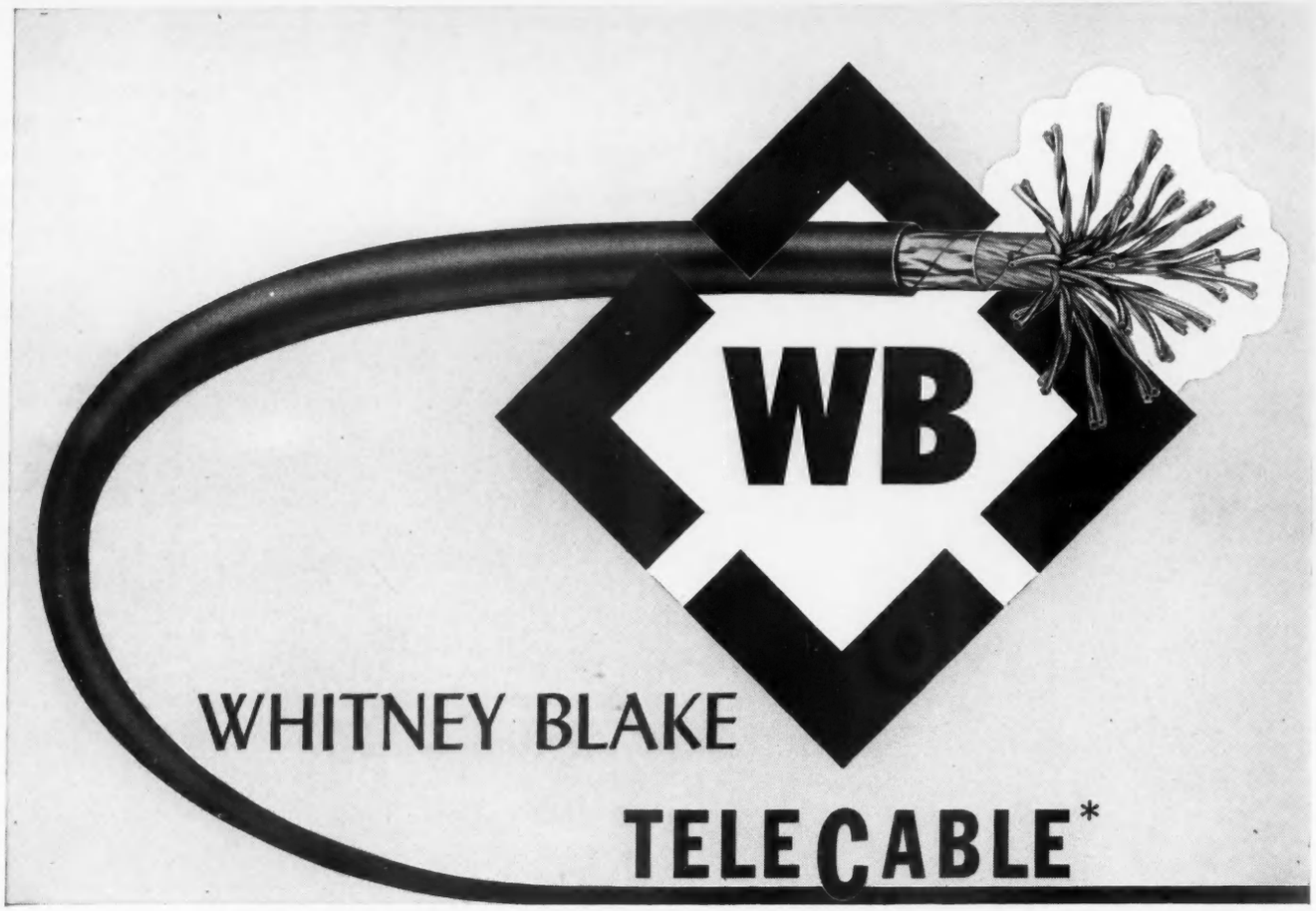
In the Stromberg-Carlson Telephone Microwave System, radio relay equipment is manufactured by RCA —leaders in this field for over 25 years. Channeling equipment is provided by the SETCO Division of Stromberg-Carlson, using the same type of channeling equipment used in wire line operation.

A booklet completely explaining Microwave and its application to telephony is yours for the asking. Ask for T-132.

1. *Microwave provides low-maintenance-cost trunks between exchanges.*
2. *Microwave radio beam eliminates installation and maintenance costs of wire toll circuits.*
3. *Microwave also carries two-way radio signals for mobile subscribers—or your own maintenance crews.*
4. *Relay stations are located at strategic points.*

Stromberg-Carlson®

ROCHESTER 3, N. Y.



is the *ONLY* Exchange Area Cable for Aerial and Duct Use with Polyethylene Insulation and POLYETHYLENE SHEATH . . . the thermoplastic sheath that *REALLY PROTECTS*

Polyethylene sheathed cable is the best cable for outside use because . . . polyethylene is the most DURABLE thermoplastic sheath material.

High molecular weight polyethylene used to sheath TELECABLE has maximum chemical inertness and possesses superior weathering properties. It withstands sunlight and extremes of atmospheric temperature. It is not subject to environmental cracking. It is extremely light weight, tough, yet flexible, and resists the stresses encountered during installation . . . It can be expected to perform satisfactorily on TELECABLE for upwards of 20 or 25 years.

No other thermoplastic material has given as good assurance of aerial cable sheath life expectancy as has polyethylene.

TELECABLE Exchange Area Cable is REA approved under Specification PE-14.

Order TELECABLE Exchange Area Cable today and take advantage of the most advanced thinking in cable design combined with the Whitney Blake reputation for products of the highest quality.

TELECABLE IS AVAILABLE FOR PROMPT DELIVERY.

Whitney Blake also makes TELECABLE Inside Wiring Cable. Order some for your inside plant.

Write for descriptive literature on TELECABLE.

*TELECABLE is a trademark of Whitney Blake Co.

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

By ROLAND DAVIES & FRED HENCK

Excise taxes on telephone service reduced to 10% . . . Congress reluctant to provide relief on highway relocation costs . . . Intrastate radio not likely to come under FCC jurisdiction . . . NLRB comes up with decision which may be landmark in personnel relations.

AS EVERY telephone man and most customers know by now, the excise tax rates on local and long-distance telephone service have been reduced to 10%, ending telephone service's stay of more than a decade in the super-luxury tax bracket.

This column does not wish to be accused of ingratitude to the lawmakers who made this change possible, but it should be noted that communications services, for all practical purposes, are still in the luxury category of excise taxation.

After all, about the only excise that was not reduced to 10% in the new excise adjustment law — exclusive of alcoholic beverages and tobacco products — was that on cabaret checks.

Thus, despite all of the logical arguments and the justice in favor of lower or completely repealed excises on communications, the rates were brought down only on the basis of a shotgun treatment, along with such items as furs and jewelry.

While no one — at least, no one with a mother, wife, or sister — regards electric and gas household appliances as luxuries, it would be hard to justify to a neutral jury the logic of having the tax on those items cut to 5% while the levy on telephone service is pegged at 10%, but that is exactly what happened in the ligislation.

But all of this has one happy aspect. Telephone people have seen the tax on their service reduced somewhat without any real Congressional consideration of their major arguments.

The tax was not reduced because 50,000,000 household units and businesses in the United States have found telephone service to be essential. It was not cut because the public has labeled it as the most disliked excise. It was brought down because all other similar utility services do not bear any excises.

It was reduced simply because a lot of other excise rates were brought down to the same level.

If the arguments are properly marshalled, the telephone industry and its subscribers appear to have as good a case for a further reduction of the levy, or outright repeal, as it would be possible to present to the 84th Congress when it convenes next January.

By the time next year rolls around, it may well be appropriate to put the excise tax where it belongs in a buyers' market, during a "normal" economy — a serious and unjust deterrent to a business which provides essential service, everywhere in the country, with a big impact on the national economic health.

Telephone subscribers finally have collected perhaps one-third of a debt long overdue. The rest of the debt is still due, and they should not be expected to be overjoyed about the partial payment.

Congress Reluctant on Highway Relocation

CONGRESSMEN ALSO have shown little disposition to take another load off the backs of the telephone subscribers — the costs of facilities relocation stemming from construction of federal-aid highways.

As has been previously reported, the bill passed by the House to authorize additional expenditures of federal funds for highway building provided only for a study of the subject. Now the Senate Public Works Committee has reported out a measure along similar lines.

If anything, the Senate bill might be a little worse, although the differ-

ence is technical in nature. In the House measure, the Secretary of Commerce is directed to make the study. The Senate bill calls for the Commissioner of Public Roads, who has vigorously opposed the utilities' position, to make the survey.

There has been little in the House or Senate committee reports, or in the House debate before the measure was passed, to encourage proponents of the principle of repaying the utilities for their expenses when they are told to move plant to make way for highway construction.

The whole situation is a difficult one for those attempting to persuade Congress to take action on it, but the efforts made to date have laid a groundwork for what may be better results in the future.

FCC Jurisdiction

TWO OTHER bills backed by the Independent telephone companies are moving along smoothly through Congress.

One is the important legislation to assure Independents not subject to Federal Communications Commission jurisdiction that they will not be brought under FCC regulation if they use radio for intrastate communications.

When this column reaches subscribers, the measure may already have been enacted into law, as it has been reported favorably and unanimously by the Senate Interstate & Foreign Commerce Committee and placed on the Senate calendar. Due to the absence of opposition, it should be passed the first time it comes up on a calendar call.

There is no doubt that the present legislation — under which any use of radio is regarded by the FCC as interstate — has been a deterrent to radio installations by Independents. Since the bill merely recognizes the original intent of Congress when it passed the Communications Act — by eliminating a roadblock which was not conceived of when the act was passed 20 years ago — it has been well-treated on Capitol Hill, and should be entered in the statute books before long.

The other measure would raise to $500,000 from $300,000 the minimum of a securities issue for which Securities & Exchange Commission clearance is required.

US Independent Telephone Association officials have been as active in support of this measure as they have on the radio bill, and it already has passed the Senate.

Favorable action by the House Interstate & Foreign Commerce Committee in the relatively near future is anticipated, and there should be no doubt about ultimate House adoption.

Coming Conventions

Illinois Telephone Association, Pere Marquette Hotel, Peoria, April 26, 27.

Wisconsin State Telephone Association, Loraine Hotel, Madison, May 5, 6.

National Executive's Conference, Broadmoor Hotel, Colorado Springs, Colo., May 10, 11.

Kansas-Missouri Telephone Association, Muehlebach Hotel, Kansas City, Mo., May 17, 18, 19.

Pennsylvania Independent Telephone Association, Bedford Springs Hotel, Bedford, May 25, 26.

New York State Telephone Association, Scaroon Manor, Schroon Lake, June 7, 8, 9.

California Independent Telephone Association, Fairmont Hotel, San Francisco, June 10, 11.

Indiana Telephone Association, Claypool Hotel, Indianapolis, June 17, 18.

Washington-Oregon Telephone Association, Multnomah Hotel, Portland, June 18, 19.

Michigan Independent Telephone Association, Hotel Pantlind, Grand Rapids, Sept. 9, 10.

Rocky Mountain Telephone Association, Newhouse Hotel, Salt Lake City, Utah, Sept. 16, 17.

Arkansas Telephone Association, Majestic Hotel, Hot Springs, Sept. 20, 21.

United States Independent Telephone Association (National Convention), Conrad Hilton Hotel, Chicago, Oct. 11, 12, 13.

North Carolina Telephone Association, Carolina Hotel, Pinehurst, Oct. 18, 19.

South Carolina Telephone Association, Myrtle Beach, S. C., (Hotel to be named later), Oct. 25, 26.

Virginia-West Virginia Telephone Association, Roanoke Hotel, Roanoke Oct. 28, 29.

Oklahoma Telephone Association, Huckins Hotel, Oklahoma City, Nov. 4, 5.

Alabama-Mississippi Telephone Association, Thomas Jefferson Hotel, Birmingham, Ala., Nov. 8, 9.

Georgia Telephone Association, Bon Air Hotel, Augusta, Nov. 12, 13.

Florida Telephone Association, Soreno Hotel, St. Petersburg, Nov. 15, 16.

NLRB Decision May Be Landmark

WITHOUT ATTRACTING too much attention, the National Labor Relations Board has come up with a decision which may be landmark in personnel relations in the telephone industry.

Even those companies not affected will recall the "hit and run" strike strategy employed by the Communications Workers of America (CIO) in past strikes. Under the method, mobile units of pickets are deployed at scattered telephone company locations on a more or less random basis. This, from the union standpoint, keeps management off balance during a strike. The management never knows where it will require its supervisory or emergency forces to maintain service during a strike, and by the time it marshalls a group to man a particular exchange being picketed, the strikers may have gone on to some other location.

This type of strike, the NLRB has ruled, is "a form of economic warfare entirely beyond the pale of proper strike activities" and not "entitled to the protection" of the National Labor Relations Act.

The board's decision, by a 3 to 1 vote — reversing a ruling of an NLRB regional trial examiner — was made in a case involving the Order of Repeatermen & Toll Testboardmen, an independent union representing Pacific Telephone & Telegraph Co. plant employes in northern California. The NLRB dismissed a complaint of the ORTT that the company discriminated against union members by not immediately returning them to work after picket lines were withdrawn.

The complaint grew out of the strike against Pacific Telephone in the summer of 1951 by the CWA, when agreement could not be reached on a new contract for traffic employes.

The "hit and run" plan, the NLRB said, was designed to compel the company to "get its defenses up" — or gather substitute workers whenever a stoppage was unexpectedly pulled — "only to have the picket line gone" when the emergency crews arrived.

The ORTT members respected the picket lines and stayed away from their jobs while the strikes were in progress. When the picket lines were withdrawn, members of the independent union would offer to work, but in some instances they were told that their jobs were "covered" or that they were "not needed" that day, and should return the following day.
The independent union alleged, the board stated, "that because the company did not put each tollman back to work immediately upon his every offer to return, but instead made many of them wait — in most cases no more than one day — it unlawfully discriminated against them."

Telephone Uses Of Power Tools

By JOHN S. REED

THE USE OF power-driven tools has increased to a phenomenal extent within recent years. High labor costs have brought on a demand for mechanized tools to perform tasks formerly requiring hand tools. Skill with power-driven tools is taking the place of muscle power with the result that workers can get their jobs done faster and easier and they do not go home quite so tired as they used to do.

Mechanized tools in general use derive power from sources such as commercial electric supply lines, portable electric generators, portable internal combustion engines (part of the tool) and portable air compressors. For work inside buildings, electric power-driven tools are plugged into electric supply outlets. In locations remote from supply lines, a portable generator can be employed to furnish power for these tools.

FIGURE ONE—A typical high-quality quarter inch electrical drill with Jacobs chuck. Porter Cable Machine Co.

Various types of mechanized tools and portable generating equipment of interest to the telephone industry are discussed in this article.

Electric Drills

THE ELECTRIC drill is perhaps the most common form of power-driven tool in use. It is a great favorite with workers in all trades and is no less prized by telephone plant men for taking the hard work out of drilling jobs.

Essentially, an electric drill consists of a universal type motor for power drive, fan blades integral with the armature shaft for cooling the motor, and a gear reduction box and spindle with chuck for holding the drills. A trigger type switch that starts the motor only when depressed and held in this position with the finger is a good safety feature.

Since the motor speed is as high as 20,000 r.p.m., the gear reduction box is needed to reduce the speed to a practical value and provide torque for heavy pulling. In the best type of drills, compound type reduction gears consisting of armature pinion, idler gear, and spindle gear, are used to assure high strength and excellent transmission efficiency.

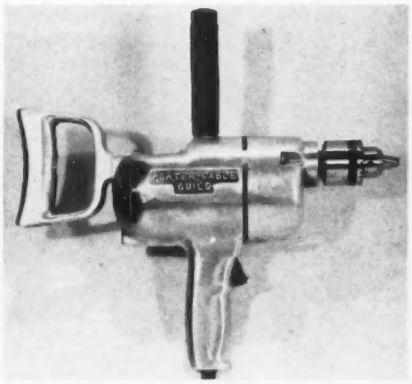


FIGURE TWO—This half inch electrical drill has auxiliary removable handles to facilitate handling the drill. Porter Cable Machine Company.

To absorb side and end thrust, a drill of good mechanical design has ball bearings for the spindle, and ball or bronze sleeve bearings for the motor shaft. Where considerable side thrust will be experienced, a long spindle with additional ball or roller bearings will take the punishment much better. The length of the gear housing gives a measure of the spindle length in selecting the type of drill.

Three general types of chucks are available, the hand chuck, hex-key chuck, and Jacobs or geared chuck. The simple hand chuck is the cheapest type, but its jaws can easily be damaged by improper use and by unbalanced loads on the spindle. When damaged, it will not grip the drill point firmly or run true. The hex-

FIGURE THREE—Mall Drill Model 125 — Half inch capacity being used in drilling holes in a repair job. This drill can handle hole saw and carbide drill bits for heavy work. Mall Tool Company.

FIGURE FOUR—Tilden Rotary Koncrete Kore Drill in use to drill 8-inch concrete foundation.

FIGURE FIVE—Using a "Hamer-Dril" attachment on ¼-inch electric drill to operate hammer type drill bit in drilling holes in tile wall.

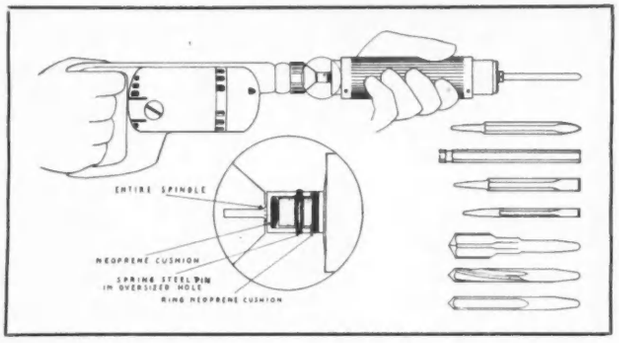


FIGURE SIX—This shock absorber protects the drill from shock of hammer blows when Hamer-Dril attachment is used with regular electric drill.

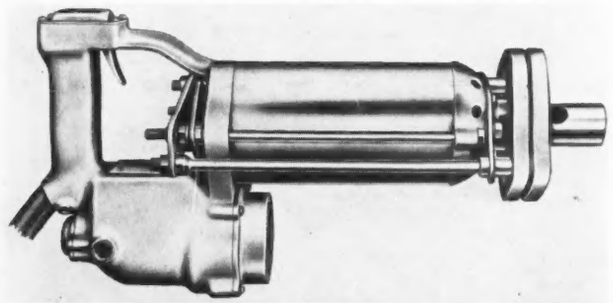


FIGURE SEVEN—Syntron No. 26-RO Hammer Drill (2 inch capacity) for heavy duty work.

FIGURE EIGHT — The Syntron No. 10-RO Hammer Drill is designed for drilling numerous small holes (up to ⅝-inch diameter) in concrete and masonry.

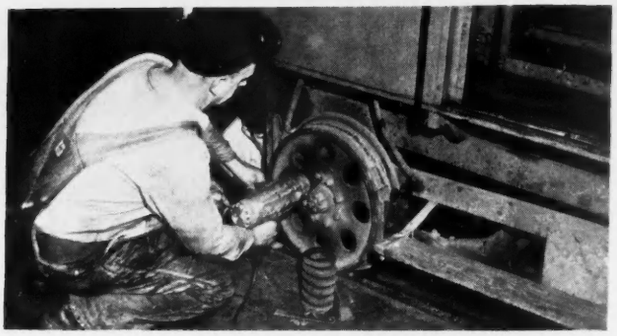


FIGURE NINE—The Mall Impact Wrench, Model 4EW Tork Hammer can be used for inserting and removing cap screws, nuts, and bolts in machine repair work.

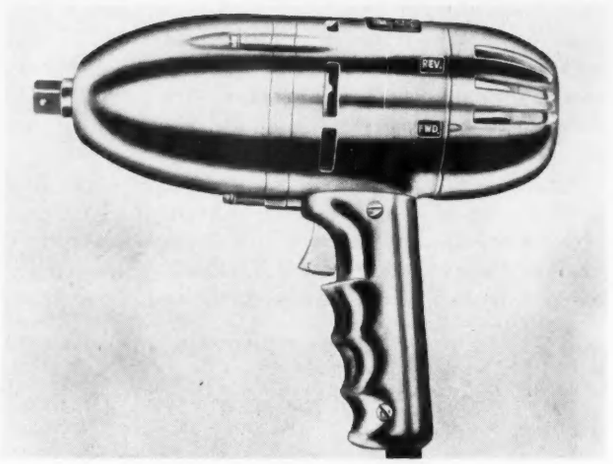


FIGURE TEN—Syntron Model No. 555 electric impact wrench designed to run and remove ⅜- to ⅝-inch nuts or bolts; drill holes up to ⅜-inch diameter with ordinary drills and up to ¾-inch with step drills; and bore holes in wood up to 2-inches in diameter.

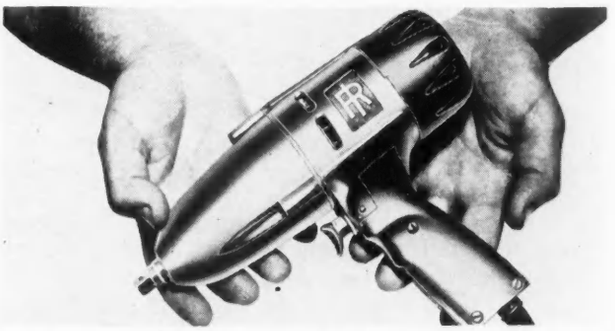


FIGURE ELEVEN—Ingersoll-Rand size 2U electric Impactool for running nuts and bolts up to ¼-inch diameter. Larger units are available for work up to ⅜-, ⅝-, and 1¼-inch bolt sizes.

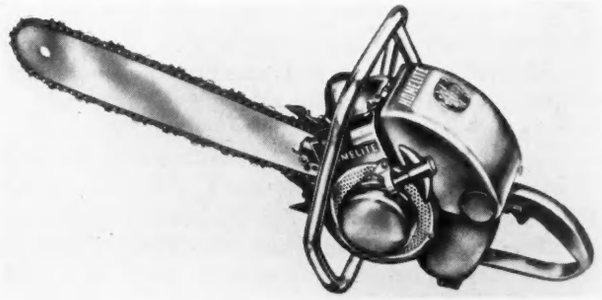


FIGURE TWELVE—This Homelite Model 17 gasoline powered saw packs 3½ horsepower in a compact 22-pounds overall weight.

FIGURE THIRTEEN—The Homelite Model 17 saw in operation. This saw can cut down 4-foot trees and can be operated in any position, up, down, right, or left.

FIGURE FOURTEEN—The Mall Model 2MG gasoline powered chain saw features finger tip controls, automatic clutch, automatic chain and sprocket oiler.

key chuck is designed to be tightened with a hexagon or Allen hollow-socket wrench. It is better than the hand chuck, but does not compare with the Jacobs chuck which has gear operated jaws that are tightened by a toothed key. This chuck cannot be damaged by excessive tightening or by unbalanced loads.

It is desirable to have a sufficiently long cord, for ease in moving the drill from one position to another. A good 50- to 100-foot extension cord will be needed where the drill is used in outdoor work, to enable use of the drill anywhere within a reasonable distance from the portable generator. It is a good idea to use a spring operated reel attached to the rear of the truck for carrying the extension cord when it is not in use. The same cord can be used for other power-driven tools, such as electric chain saws.

The size of the drill to use depends on the job. With the usual fluted drills, this tool will cut holes in metal up to its rated chuck capacity, ¼-, ⅜- or ½-inch, the most commonly used sizes being ¼- and ½-inch.

The ¼-inch drill, like the one illustrated in *Figure* 1, has a free running speed of about 2,000 r.p.m., and is designed for light intermittent drilling. Its usefulness and versatility, however, can be improved by accessory tools or conversion attachments. Thus, it will do a fine job of drilling holes up to 1-inch in diameter in wood, with flat type bits. At the high drill speed, the flat bit cuts cleanly through the wood, making this size drill handy for telephone installers for boring holes in running drops or instrument wires in buildings.

Conversion attachments such as clutches, torque converters, reversing or speed changing gears, enable the drill to be used for driving screws, tapping holes, and hammering drills for cutting holes in masonry. For work in close quarters, a right angle drill attachment is available. This device enables the drill nose to be brought up close to the work as when boring holes in wall studding or ceiling joists.

The ⅜- and ½-inch drills (*Figures* 2 *and* 3) are intended for heavier intermittent drilling work on account of their more powerful motor and gear drive, and sturdy construction. Because of the use of a double compound reduction gear to increase the torque, they are slower in speed, running about 450 r.p.m. and thus can be employed to drive tools requiring a low turning rate. These heavier and slower speed drills are thus adapted to boring holes in wood with standard auger bits and expansion bits. They are especially effective for drilling holes in masonry and concrete with drill bits of the proper type, such as carbide tipped rotary drills.

Rotary Drill Bits for Use With Electric Drills

CARBIDE TIPPED rotary drills of the type illustrated in *Figure* 4 have cutting teeth made of sintered tungsten carbide, one of the hardest known materials. For the make of rotary drills discussed, drill bits 7/16-inch and smaller are of the "centerless" type, which are stated to be three to four times more efficient than ordinary pointed drills. Larger drill bits have a core design in which the cutters are attached to the perimeter of a cylinder or core where they operate at

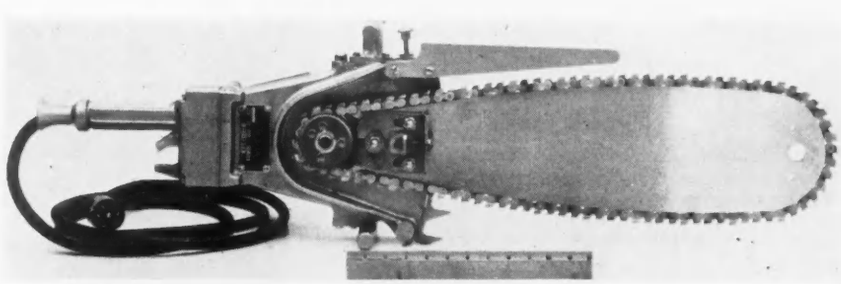


FIGURE FIFTEEN—The Homelite Model ECS-20" saw has open housing to prevent clogging of saw from wood chips, spike plate to feed saw into work, and plunger oiler that squirts oil on saw chain. It features a 180-cycle ac motor with high power efficiency.

FIGURE SIXTEEN—Demonstrating how the Homelite Model ECS-20" saw is used in removing tree limbs. Note chips being deflected away from saw.

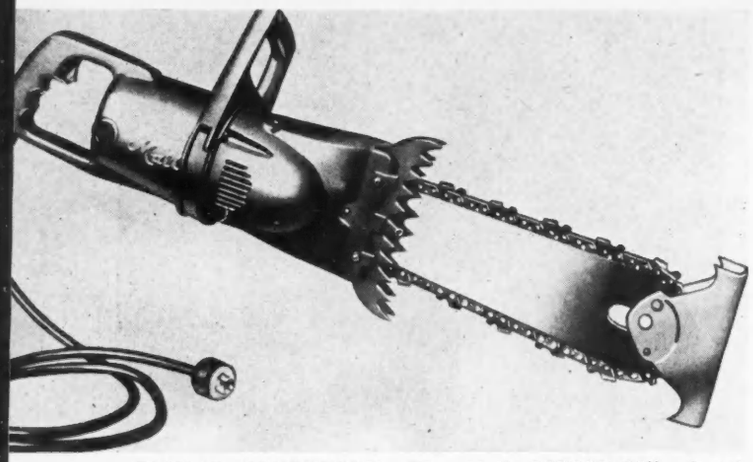


FIGURE SEVENTEEN—The Mall 11E12D-20" electric chain saw for operation on standard house current or from portable generator for cutting trees up to 36" in diameter. Front bumper shown is removable, and top handle swivels to any position.

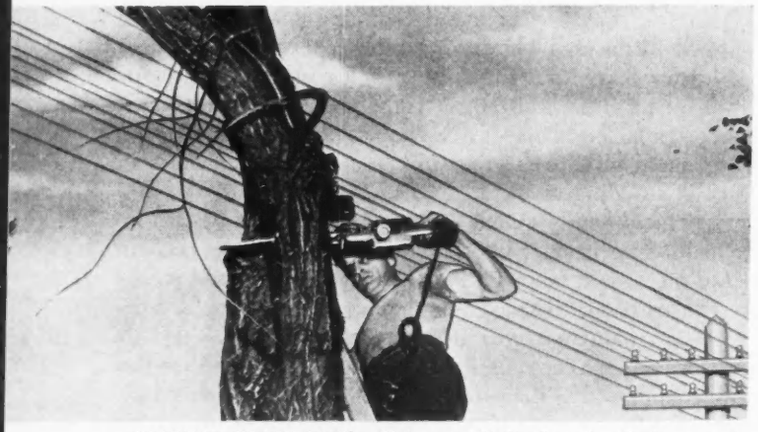


FIGURE EIGHTEEN—Using a Mall electric chain saw to cut a tree down piece meal.

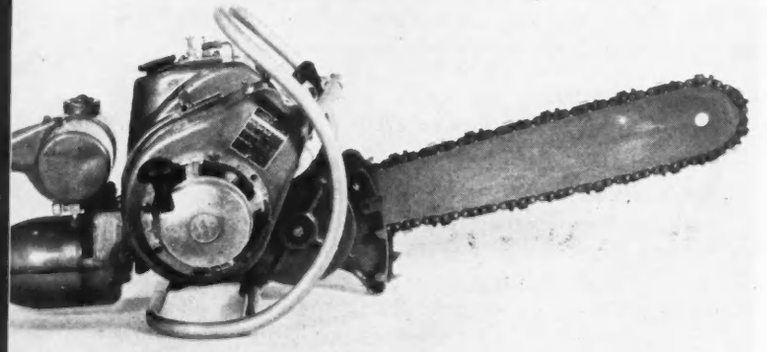


FIGURE NINETEEN—The Luther 20-inch chain saw is equipped with 4500 r.p.m. gasoline engine, automatic starting cord rewind, automatic centrifugal clutch and plunger chain oiler.

FIGURE TWENTY —Mall 16-inch disc cutter with Model 2MG gasoline engine on wheel carriage for cutting brush.

the most efficient speed. Because of the core construction, the drill cuts a smaller area of hole than pointed drills. The resulting concrete or masonry core is broken out and removed from the hole or else breaks off inside the drill and the fragments will come out through the slots in the cylinder.

The cutters in both drill bit designs will retain their cutting edge much longer than ordinary drill bits. The cutters can be re-sharpened on an ordinary bench grinder whenever necessary. Since no hammering is involved, these drill bits do not cause flying chips and cut clean holes. They will cut through reinforcing rods or steel beams embedded in concrete that might deflect or stop an ordinary drill bit.

The Tilden rotary drill bit illustrated will drill holes from 3/16- to 1 7/8-inches in diameter with hand pressure. Larger holes require a lever or screw to maintain adequate pressure. Pressure is needed to prevent premature wear of the cutters.

Electric Hammer Drills

ELECTRIC hammer drills are designed to deliver a rapid series of blows against the end of a hammer type drill bit and thus substitute mechanical power for muscular effort in driving the drill bit into the material.

One type of electric hammer drill is illustrated in *Figure* 5. It is a conversion attachement designed to be chucked on a regular ¼-inch motor driven drill. This attachment converts the rotary motion of the electric drill into a hammering action. It is not a vibrator but strikes a blow for each revolution of the drill spindle. As indicated in *Figure* 6, a shock absorber is incorporated in the convertor unit to protect the electric drill from the percussion effect.

The Hamer-Dril illustrated is especially designed for drilling holes in brick, tile, stone, and concrete. With two sizes of tool holders it will take drill bits from 5/32- to 1/4-inch and 5/16- to 7/8-inch. In use, the drill and attachment are held as illustrated and the attachment is allowed to slip slowly in the hand (or turned back and forth one-half of a circle) to keep the drill bit from seizing in the hole.

A type of electric hammer drill that operates on a different principle is illustrated in *Figure* 7. This tool is designed for rapid drilling in concrete and masonry and employs carbide-tipped spiral drill bits.

This type of hammer drill has a barrel surrounded by two coils mounted side by side. A pulsating current fed alternately to the coils sets up a pulsating magnetic field that pulls a free piston back and forth inside the barrel. The vibrating piston applies 3600 blows per minute to the drill. The pulsating current is obtained from a controller unit inserted in the circuit from the alternating current supply line.

The hammer drill model illustrated in *Figure* 8 is well suited for telephone and central office installation work, where a large number of small holes must be drilled quickly in concrete or masonry.

Impact Wrenches

THE IMPACT wrench is built like an electric drill except that it has a special cam arrangement to impart a series of rapid rotary blows to the spindle when

FIGURE TWENTY-ONE—Setting pole with truck derrick and winch line, after using portable earth digger shown set to one side. Photo courtesy of Tel-E-Lect Products, Inc.

FIGURE TWENTY-FOUR—Tel-E-Lect Company's portable digger operates from the power take off on the truck. It is simple in construction and convenient to use.

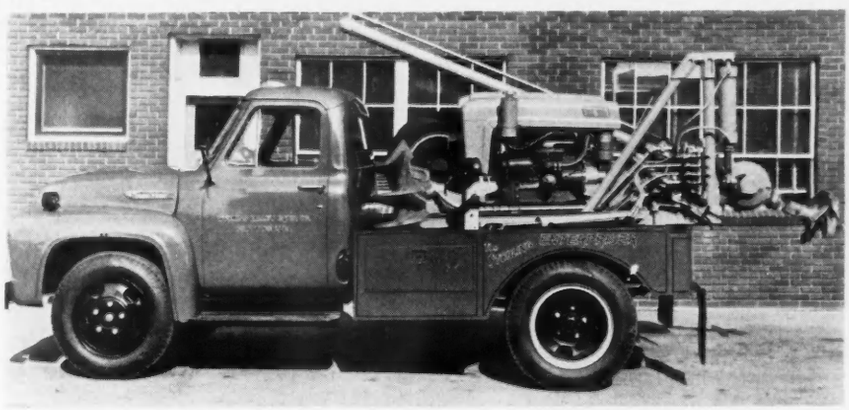


FIGURE TWENTY-FIVE—Sterling Enterpriser Model G-4 earth boring machine is capable of boring 10" to 20" holes 7½ to 9½ feet deep according to length of rack bar shaft furnished.

FIGURE TWENTY-TWO—Digging pole hole with electric driven portable digger. Note gasoline driven generator on truck in background. Photo courtesy D. W. Onan and Sons, Inc.

FIGURE TWENTY-THREE—Model P. E. portable digger uses a flexible drive shaft from portable gasoline engine to operate auger, and does not require connection to a power take off. Safety of operation is assured by an automatic clutch and quick-action controls. Highway Trailer Company.

FIGURE TWENTY-SIX—Operation of Sterling Enterpriser with boring machine is facilitated by a hydraulic control system which governs the lifting, leveling, and operation of main auger shaft. Finger tip control enables operator to keep machine under control at all times, saving time and expensive repairs.

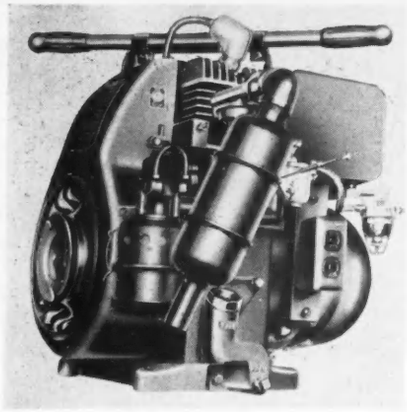


FIGURE TWENTY-SEVEN—Onan Model 10LS 1000 watts, 115 volt, 60-cycle ac or 1500 watts, 115 volt dc portable generator is easily moved from job to job supplying power for drills, saws, and floodlights.

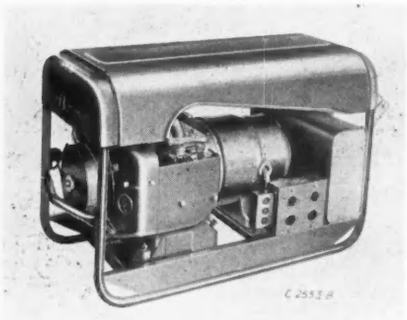


FIGURE TWENTY-EIGHT—The Onan 1500 and 3000 watts, 115 volt, 60-cycle ac or 2000 and 5000 watts 115 volt dc two cylinder electric plants are economical-to-operate heavy-duty units. They are particularly suited for electric operated earth diggers.

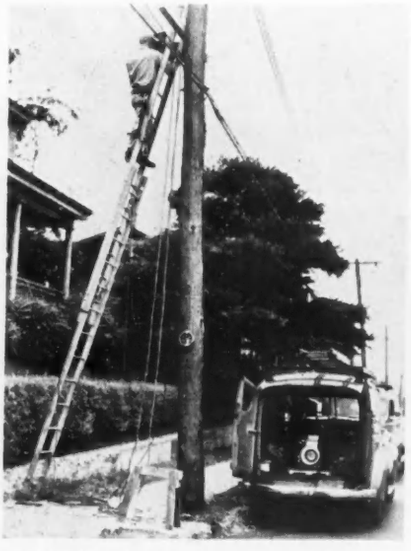


FIGURE TWENTY-NINE—This public utility worker is using a portable generator outfit to operate an electric drill. (Photo courtesy of D. W. Onan and Sons, Inc.)

the torque load on the spindle reaches a certain point. Turning the end cap of the tool actuates a reversing mechanism to change the direction of rotation. *Figures* 9 to 11 illustrate various makes of impact tools.

As indicated in *Figure* 9, the impact wrench has considerable utility for tightening or removing nuts, bolts, cap screws, and lag screws. In the telephone plant, it can be employed for tightening nuts on guy clamps, cross arm bolts, suspension strand bolts, carriage bolts, and lag screws. It is effective for loosening frozen nuts or bolts and is less likely to damage the fastenings than ordinary hand wrenches.

The impact wrench can also be used to drill holes in steel, wood, or masonry, using the proper type of drill bits. This feature makes the tool more useful in that it can be used to bore holes in poles and cross arms and, on occasion, to drill holes in concrete or masonry in installation jobs.

Portable Power Saws

POWER-DRIVEN table saws have long been employed in the wood working industry, yet it is only within recent years that portable type power saws that can be handled like hand saws have come into general use.

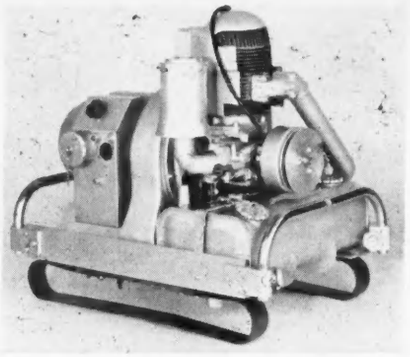


FIGURE THIRTY—The Homelite 5 KW generator supplies 115 volt and 230 volt current at 4% voltage regulation from no load to full load. It can be easily carried by two or four men by means of the four adjustable handles shown.

Various kinds of portable power saws other than the disc cutter type are available. For tree and hedge eradication, chain saws are very popular with telephone companies because of their high efficiency, simple operation and ability to effect considerable savings in time and labor. These saws make use of a toothed endless sprocket chain operated by a suitable power drive to cut through wood.

The chain saws are available in electric, gasoline engine, and pneu-

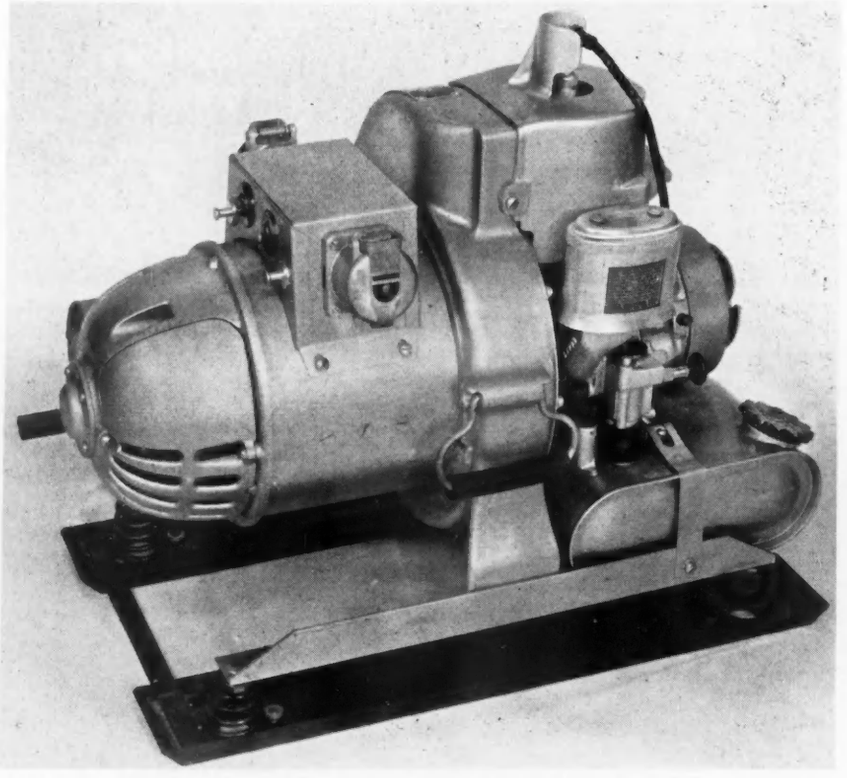


FIGURE THIRTY-ONE—The Homelite Model 24HY dual-purpose high cycle generator furnishes 230 volt, 180-cycle, 3-phase ac and 110 volt dc from separate outlets.

matic (compressed air driven) models. The electric and gasoline engine saws are considered most suitable for telephone plant work. Where a portable generator is carried on the maintenance truck to supply current for operating other power tools and for emergency purposes (supplying central offices during commercial power failures), the electric chain saw is considered to be more economical to use. The gasoline powered saw, however, has a good point in that the self-powered unit does not require a connecting cord and thus is easier to handle in tangled growths.

In *Figures* 12 to 19 are clearly shown desirable characteristics of good chain saws. The important things to note are that the saws have toothed bumpers to make the saw chain bite into the work instead of riding on top of it, plunger or automatic type oilers to keep the chain properly lubricated, and housing construction that permits either self cleaning or easy removal of wood chips and chips tending to accumulate at the chain drive sprocket.

For cutting brush at the ground line, a portable disc saw is available as indicated in *Figure* 20. This device makes use of a 16-inch cutting disc driven by a portable gasoline engine, the whole unit mounted on a wheel carriage that is to be pushed and guided by a double handled frame, with throttle attachment for controlling operation of the saw.

Earth Boring Equipment

PORTABLE EARTH diggers were developed to meet a need for simple pole hole boring equipment that would not require a heavy outlay for machinery for ordinary line construction and maintenance work. Besides boring pole holes, these diggers can be employed to dig anchor holes or screw in anchors. After using the digger, it can be laid aside and the pole set in the pole hole with the truck derrick and winch line, as indicated in *Figure* 21. Such equipment enables two- or three-men crews to do the work of five-men crews in erecting ordinary pole lines.

Portable diggers obtain power from an electric motor coupled directly to the auger shaft as shown in *Figure* 22, gasoline engine with flexible drive shaft (*Figure* 23), or power take off on the truck (*Figure* 24).

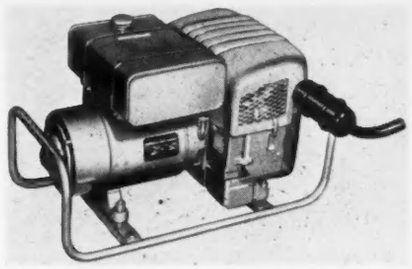


FIGURE THIRTY-TWO—The Mall H5 generator set provides 115 volts dc, 17.5 amperes and 230 volts 3-phase 180-cycle ac, 21.7 amperes.

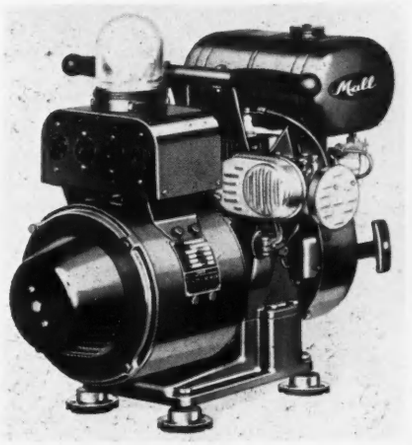


FIGURE THIRTY-THREE—The Mall IDC generator provides 1500 watts, 125 volts dc for tools with universal or dc motors.

For heavy line construction work where a large number of holes are to be bored, earth boring machines such as that illustrated in *Figures* 26 *and* 27 are employed. Although the machine illustrated is heavy duty, it is light in weight.

Portable Generators and Self-Contained Gasoline Engine Drive

PORTABLE ELECTRIC power tools require a portable power plant when used in locations remote from commercial supply lines. The simplest and most practicable unit of this kind is a gasoline engine driven generator of compact and lightweight design like those illustrated in *Figures* 27 to 35, to generate current for the motorized tools.

Portable power plants are generally available in capacities ranging from 400 watts ac or 750 watts dc to 3000 watts ac or 5000 watts dc. The proper size plant to use depends on the expected load requirements. To avoid unsatisfactory operation and damage to the power tools, it is very desirable that the electric plant has a capacity not less than the wattage rating of the power tools.

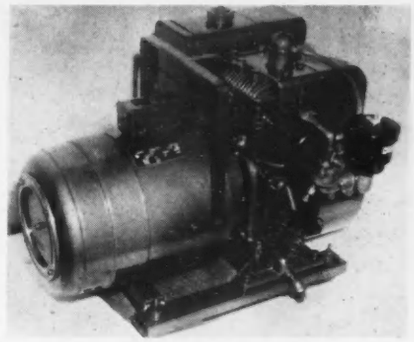


FIGURE THIRTY-FOUR—The Katolight lighting plant generates standard 60 cycle alternating current and is available in 650, 1350, and 2000 watt sizes.

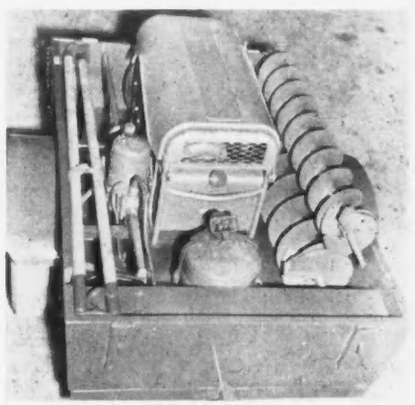


FIGURE THIRTY-FIVE—This trailer is used to transport an Onan 5KW dc generator for operating a Ka-Mo electric operated earth digger.

The wattage rating of any electric power tool can be determined by multiplying voltage rating by the current rating given in the name plate, regardless of whether ac or dc supply is used. Thus a chain saw with a rating of 115 volts and 11 amperes has a rating of 1265 watts, requiring at least a 1200 watt generator.

However, where heavier duty power tools are also used, it is well to select a portable power plant that will handle the heaviest rated tool at maximum loads. For example, electric portable power diggers will operate most satisfactorily when the power plant capacity is 5000 watts dc. Diggers are required to operate under adverse conditions and often in gummy soil that would tax the drill motor to the utmost. Under such conditions, the motor may operate at a higher current consumption and require more power than under normal conditions.

The choice of an ac or dc power plant depends on the telephone company's requirements. If the portable plant is intended to be pressed into service to supply current to a cen-

FIGURE THIRTY-SIX—The Mall 2MG gasoline engine can be used with various detachable attachments for (a) drill bit; (b) earth auger; and (c) pump.

tral office in event of a prolonged commercial power failure, an ac type with ouput rating of 115 volts should be employed. A generator of this kind can be plugged into the power mains at the office and used to operate the charging equipment through the office rectifier and at the same time furnish power for the lights.

Where the generator is intended to be used only for power tools and flood lights, the dc type will provide the maximum power output for the generator size. Dual purpose high-cycle generators are also available for operating power tools equipped with 230 volt, 180 cycle, 3-phase alternating current motor and to provide 110 volts dc for flood lights and standard dc or universal motor tools. *Figures* 31 and 32 illustrate the high-cycle generators.

An important precaution to be observed in connecting the power plant to the motor driven tool is to use a cord with adequate conductor size. A long cord with small size conductors will cause excessive line voltage drop. With a low voltage appearing at the motor terminals, the field winding of dc motors will overheat and may burn out. For heavy duty tools, like the portable digger, it is very essential to provide the shortest practicable length of connecting cord and use No. 14 or No. 12 gauge conductor size. If long length cord must be employed (100 to 200 feet) it may be necessary to obtain cords with No. 10 gauge conductors.

Portable power plants may be transported in the construction truck and, if necessary, carried by hand to the desired site of work. The larger size portable plants may be transported in a trailer as illustrated in *Figure* 35.

At least one company has conceived the idea of using a gasoline engine with various types of detachable tools to be attached and operated directly by the engine drive. Thus the portable engines used with the chain saw illustrated in *Figure* 14 can be separated from the saw and employed with other types of tools designed to be attached to it as indicated in *Figure* 36.

Maintenance of Power Driven Tools and Generators

SKILLED EMPLOYES recognize the value of properly maintaining power driven tools. The most im-

Please Turn To Page 73

New Ideas Improve Job Performance

By MYRLE SHAFER

FIGURE ONE—This Keller Wire Wrap Tool has an air motor for operation on compressed air. The same tool is also available with electric motor for operation on 110 volts ac or dc.

New Solderless Wire Wrap Method For Connecting Wires to Terminals

THE STANDARD method of converting wires to terminals is to wrap a single turn of the skinned wire around the lug with pliers (or hook the wire end through a hole in the lug) break or snip off the surplus wire end and solder the connection. Such a procedure involves the hazard of solder and wire clippings dropping into other terminals and causing shorts or grounds. Also, the terminals cannot be closely spaced and must be mounted in insulating material that can withstand the heat from the soldering operation.

As the result of work with new types of telephone relays requiring small, closely spaced terminals, the Bell Telephone Laboratories developed the idea of wrapping wire ends around the terminals with such closely spaced, tight turns that no soldering is needed to make the connection permanent. Further development work with the cooperation of Western Electric Company and Keller Tool Company improved the technique and led to the production of suitable power driven tools for wrapping the wire around the terminals under considerable tension.

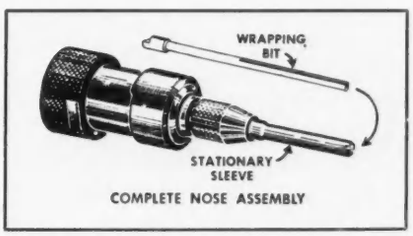


FIGURE TWO—Nose assembly for Keller Wire Wrap Tool.

The power tool produced by the Keller Tool Company has an air or electric motor to drive a wrapping bit in the nose assembly that whips the wire around the terminal. Either type of tool has a pistol grip with trigger control and is of light weight balanced construction for ease of handling. Also available is a straight handle model with lever control. *Figure* 1 shows an air motor type with pistol grip.

Figure 2 illustrates the construction of the nose assembly. Various sizes of nose assemblies are available for different wire gauges and

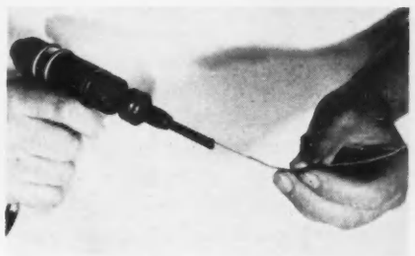


FIG. 3-A—Skinned portion of wire ready to insert into small hole of wrapping bit.

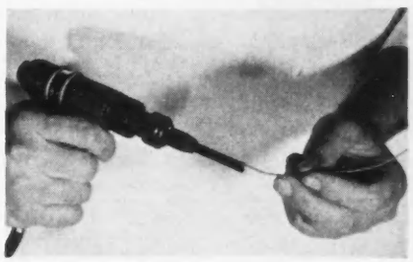


FIG. 3-B—Wire inserted up to the insulation.

FIG. 3-C—Wire anchored in retaining notch.

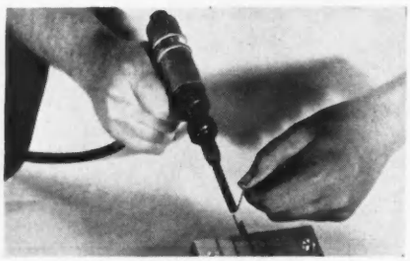


FIG. 3-D—Large hole of wrapping bit ready to be placed over terminal.

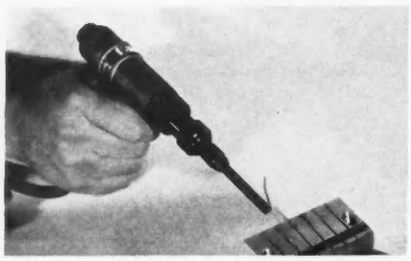
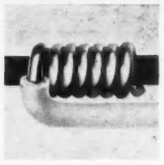


FIG. 3-E—Pulling trigger whips wire around terminal.



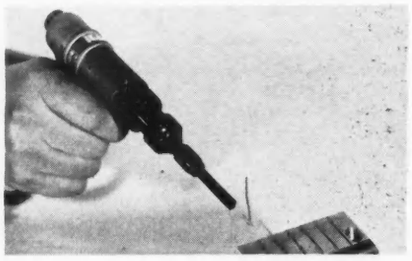


FIG. 3-F—After releasing trigger tool is removed to show completed connection

terminal dimensions. It should be noted that the solderless wrap method is not considered practicable for 1/8-inch terminals or larger. However, wires can be wrapped on 1/8-inch terminals with the proper size nose assembly and afterwards soldered.

Fig. 3A-3F shows how the wire wrap tool is used to wrap wire around terminals. The torsional force applied by the tool is such as to twist the rectangular terminal slightly.

Under the high tension applied, each quarter turn is locked in place as it is bent around the sharp corner. Both wire and terminal are indented at the points of high pressure contact, creating a permanent metal-to-metal contact unaffected by corrosion, vibration, and age. A ten-pound pull is needed to strip the wire from the terminal.

The solderless wire wrap method has a wide application in manufacturing work and is expected to find considerable use in radio, television, and other branches of the electronic industry. Advantages claimed are faster and more uniformly made connections, less training of operators required, and less rigid inspection needed than with older methods.

Drop Wire Coverings Assure Long Life

THE GREATEST improvement in drop wire insulation came about as the result of the use of a tough neoprene jacket over the inner insulation. It was thought advisable at first to continue the use of a protective wire guard over the drop wire at points of contacts with trees. A midwestern company decided to test the actual need for protective guards by replacing all drops in one exchange with new neoprene jacketed wire in a plant rebuilding project. In another exchange all drops were replaced with new polyethylene insulated drop wire for comparison purposes. The drops were strung directly from the terminal poles or open wire connections with no attempt being made to route the wires around trees or other obstructions or to protect the wires with suitable guards. The men were, however, instructed to string the drops with specification sag or greater.

This test was started in 1946 and a record of trouble reports from the two exchanges was maintained. After nearly eight years, drop troubles reported were found to be due to lightning damage, mechanical breakage as the result of snagging on trucks, or heavy tree limbs breaking and falling on the wires; but there were very few of these cases.

Only two cases of trouble attributed to tree contact were reported; the result of excessively tight spans (contrary to instructions) which brought the wires in rubbing contact with large tree limbs. Where wires were strung with specified sags or greater, there was no damage to the drop covering that could be observed. As the result of this experiment, the company has discontinued the practice of installing wire guards on their drops for protection.

Subscriber Trunk Carrier for Rural Communities

RECENT DEVELOPMENT of a new, low-cost carrier-telephone set especially designed for rural subscriber trunk service is stated to enable the economical expansion of rural telephone service using existing telephone wire facilities. Up to 30 additional subscribers can be added to a single, existing, pair already carrying a 10-party service, and the operating range can be extended beyond the presently limiting loop resistance, effectively doubling the talking and signaling range. It is equally adaptable to open-wire, cable or combination circuits.

The Budelman type 16-A carrier telephone equipment, illustrated in *Figure* 5, provides carrier voice channels for use on rural telephone subscriber circuits, inter-office trunk circuits, industrial wire circuits and multi-channel radio links. The equipment is capable of providing up to

three duplex channels in addition to the existing voice-frequency circuit when used on open-wire or cable two-wire circuits. When used on radio links, up to six voice channels are provided in addition to the voice frequency circuit which is normally used as a servicing channel. It provides self-contained rural subscriber trunk carriers, each capable of handling up to 10-party lines without auxiliary equipment.

The use of double-sideband transmitted-carrier amplitude modulation simplifies the circuit design, provides savings in filter costs, and permits direct transmission of signaling and ringing voltages with a large saving in overall cost.

Each channel is completely self-contained and powered from 115 V. 50-60 cycle ac and requires but 7″ of relay rack space. The channels are stackable without auxiliary equipment. When used for subscriber service, the carrier terminal supplies talking battery and multi-frenquency ringing current for single or party-line circuits up to 10 subscribers on a bridged-ringing basis. The equipment is equally applicable to either manual or automatic central offices. When used in inter-office trunk circuits, the channels may be connected for E & M, ringdown, or loop-dial signaling.

The equipment is normally supplied with a two-wire voice termination circuit, but can be connected when desired for four-wire termination. Each carrier channel terminal consists of two 3½″ rack panels. One contains carrier and audio frequency circuits and is identical in all applications except for channel filter frequencies. The second panel contains power supply, relay, and ringing facilities. It is made in two basic types, one for central office use and one for subscriber use, the main difference being the addition of a talking battery power supply and ringing current amplifier in the case of the subscriber terminal.

When used to supply party-line service the carrier chassis may be

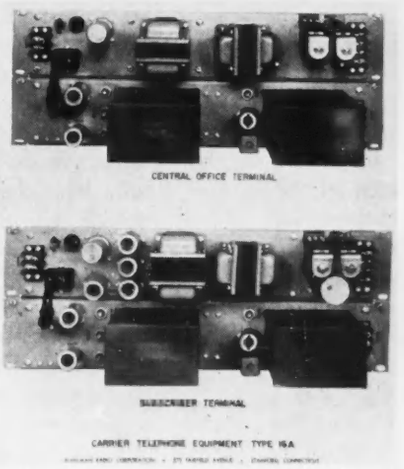


FIGURE FIVE—Budelman Type 16A Carrier Telephone Equipment For Rural Line Carrier.

pole mounted in an outdoor cabinet especially designed for the purpose. The central office unit is designed to be mounted on the office relay racks. For individual subscriber service, the carrier set may be mounted in the subscriber's home or office.

Characteristics of the Budelman carrier equipment are shown in the accompanying table.

Available Carrier Frequencies:—	Channel 1 10.0 Kc and 18.5 Kc Channel 2 27.7 Kc and 36.8 Kc Channel 3 45.8 Kc and 55.0 Kc
Nominal Carrier Output Level:—	+17 DBM at 600 ohms
Minimum Carrier Input Level:—	−35 DBM at 600 ohms
Maximum Carrier Line Loss for 6 DB Talking Circuit:—	Approximately 52 DB
Audio Input (for average talker):—	Adjustable −12 to 0 DBM
Audio Output Level:—	Adjustable +10 to −10 DBM
Overall Audio Response:—	±5 DB 100-2500 CPS
Residual Noise:—	60 DB Below Average Talking Level
Average Interchannel Crosstalk:—	−45 DB with Three Duplex Channels Operating
Minimum Required Ringing Signal:—	50 Volts
Operating Power per Channel:—	20 Watts at 115 V. 50-60 cycles
Maximum number of subscribers per channel:—	10
Maximum Subscriber Loop Resistance:—	1200 ohms
Ringing Voltage:—	100 volts minimum 16-66 cycles at far end of 1200 ohm loop with 10 bridged subscriber sets
Standby Power Requirements per channel:—	20 Watts at 115 V., 50-60 cycles
Operating Power Requirements per channel:—	25 Watts (35 Watts during ringing)

Eliminating Noise Induction on Rural Lines

THE VINCENT Rare Gas Relay has been used for a number of years to eliminate noise induction on telephone lines employing divided or selective ringing where the ringers are connected between one side of the line and ground. As indicated in *Figure* 6, the rare gas relay is connected between the ringer and ground in every subscriber set on the line.

To obtain best results from the use of the rare gas relay, the noise indication must be due to grounding of the line through the ringers. If disconnecting all ringers from the line makes the latter quiet, the rare gas relay will stop the induction when connected in every ringer circuit to ground. The line must be properly transposed in accordance with an approved transposition scheme and must have no sources of leakage to ground, such as tree contacts, or unbalanced resistance. ***Please Turn To Page 48***

The manufacturer specifies a ringing voltage of 100 volts minimum for selective ringing or 90 volts minimum for non-selective ringing. For selective ringing the higher voltage might cause cross ringing without the rare gas relays in the circuit, but with the relays in place no trouble will be experienced.

Experience indicates that the ringers should be connected so as to balance the line, particularly when noise induction is severe and the slightest unbalance seems to bring the noise in on the line. Better line balance is obtained by rearranging the ringer connections so as to pair off two ringers, one between one side of the line and another between the other side of the line and ground, as indicated in the circuit pictures in *Figure* 6. This method is not always practicable as there will be lines that have an odd number of stations so that one side of the line has one more ringer connected to it than the other, or the station locations are staggered so that it is not possible to exactly pair off ringers for line balance. Even then, the rare gas relays will reduce the noise to a minimum, and there will be less chance of the relays remaining operated after ringing current passes through them, due to a high inductive voltage. The effect of pairing off the ringers is to bring the ground connections of the ringers as close to a common point as possible with respect to the line. This has the effect of balancing the line, and reduces the induced voltage to a small figure.

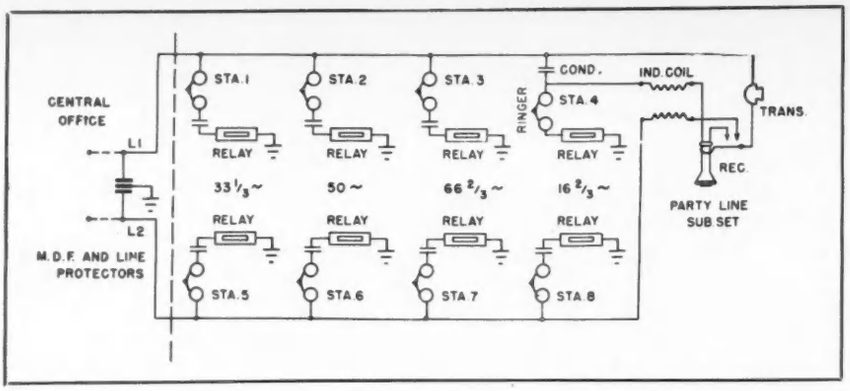


FIGURE SIX—Showing how the Vincent Rare Gas Relay is connected in the ringer circuit of each subset.

New Adhesive Said to be Ideal for Many Mounting Jobs

DEVELOPMENT of a super-strong all purpose adhesive is announced by Pioneer Latex and Chemical Company, Middlesex, New Jersey. The manufacturer says that its new product, Placco 1000, has demonstrated through extensive on-job experience that it can out-perform heavy duty nails, screws, bolts and clamps in many jobs. One of the principal reasons given for the superior performance is that as an adhesive, Placco 1000 enables ease of application and eliminates drilling of surfaces such as masonry and metal.

Many surfaces, including wood and masonry, will tear away before Placco 1000 will fail, the Pioneer company says. According to measurements by United States Testing Company, a two-inch square bond on Placco 1000 will withstand the tremendous pull of more than 300 pounds at temperatures above 300 degrees F.

Placco 1000 is a quick setting, heavy bodied, rubbery material. An important use is fastening heaviest bathroom and kitchen fixtures to smooth wall surfaces. Among other applications it has been used successfully for making adhere to wood, masonry and metal such items as hangers for wire, pipe and conduits; nailing strips; electrical wiring fixtures; and wallboards and flooring materials. One suggested telephone application would be installation of subsets where a backboard could be cemented to the wall surface and used to mount the set. Another application would be the attaching of a desk set connecting block to plaster surfaces which will not hold screws for mounting the block.

Placco 1000 is described as having the capacity to adhere to porous and non-porous surfaces with equal facility, and additionally, the ability to serve as a protective coating that won't come off and a coating which, because of its toughness, resists abrasions and the harsh actions of minerals and chemicals. It is claimed to be waterproof, heat resistant, permanent under all weather conditions, flexible, corrosion resistant, non-inflammable, non-toxic, gives off no fumes and will not contaminate foodstuffs.

Case Transposition Brackets for Crossarm or Wire Span

WHERE POINT type transposition is employed as in carrier open-wire circuits, the use of Case Transposition Brackets (*Figure* 7) enables long runs to be tensioned in one operation on these brackets. The revolving insulators allow free movement of the wire at the transposition point.

The maintenance problem, as a result of glass insulator breakage, is greatly simplified through the use of this bracket, as it does not require any emergency glass insulator replacement. It changes the costly emergency glass insulator replacement problem on point brackets to simple routine scheduled maintenance. In event of insulator breakage, the line wire falls on a special rubber bushing permitting continu-

ity of circuit operation thereby assuring no loss of communication service. Circuit efficiency is maintained in spite of glass breakage.

The Case Crossarm-Type Transposition Bracket weighs less than 4 lbs., complete with insulators and special rubber bushings. It is fabricated from aluminum and has great strength and rigidity and, since it is cast in one piece, requires only one fabricating step. The bracket is supplied in right-hand or left-hand types. The brackets are so arranged that they can be mounted on any standard crossarm having pin spacings from 8 to 12 inches, without the necessity of re-boring the crossarm. The wire spacing of the bracket is the standard 8 inch carrier circuit spacing.

The Case Transposition Bracket is also available as a span bracket. This

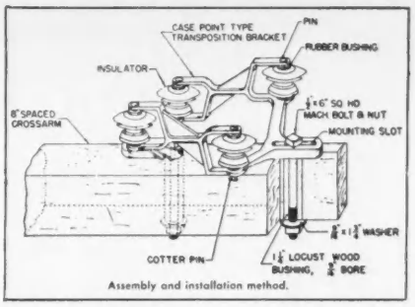


FIGURE SEVEN—Method of installing Case Transposition Brackets on crossarm.

bracket makes it possible to transpose communication wires at any point of the line between poles, regardless of pole spacing. The bracket is simple in design, lightweight, and may be easily installed in exact position. It eliminates the cost of constructing and maintaining special transposition poles in long spans and in short spans over uneven terrain. In event of glass or porcelain insulator breakage, the line wire falls back against the rubber bushing, assuring continuity of circuit operation with no loss of communication service. Circuit efficiency is maintained in spite of breakage, and the costly emergency replacement problem is reduced to routine scheduled maintenance.

The span bracket is available in two models, one a light span bracket for standard line construction, and the other a high strength bracket for river crossings and long spans where heavy wire or strand is placed at high stringing tensions. The high strength bracket will stand stringing tensions up to 5000 pounds per wire. Either model is obtainable in right-hand or left-hand style.

Labels Streamline Telephone Numbering Costs

A NUMBER OF telephone companies of the Bell System are in the process of setting up a new "two-five" dialing system. Under this system, long distance calls can be made without first getting the operator. New numbers, however, must be assigned to the subscribers in these areas. This normally requires a service trip to every subscriber to replace the old number card with a new one, which is quite expensive when a large number of subscribers must be contacted by a company representative for this purpose.

With the new numbering method, every subscriber is mailed a new number on an Avery Kum-Kleen Label, obtainable from the Avery Adhesive Label Corp., Monrovia, Calif., which the subscriber applies himself, as shown in *Figure* 8. This label has a pressure sensitive adhesive on the back.

The user just rolls the backing tape away from the self-adhesive label and applies the new telephone number label right over the old card in a matter of seconds.

FIGURE EIGHT—Avery adhesive telephone number labels can be applied by the subscriber to save service trips.

New Outdoor Telephone Booths

AS THE LONG dormant potentialities of outdoor paystations more and more become realities, this service assumes its proper place in the telephone industry as an established, permanent facility.

Whether viewed as necessary public service, or from the income of a prime revenue-producing location, the wisdom of providing quality installations has been proved many times over. Stories of the psychological effect of bright colors and stories of revenue exceeding all expectations have been told and retold and they all point to one thing: the attraction of a quality-conscious public to inviting surroundings.

Now with the still further expansion of outdoor telephone service on a 24-hour a day basis, the importance of night lighting has become more and more evident in attracting attention to the availability of the facilities and in instilling confidence in the user. Both of these are proving to be important considerations, particularly at unattended highway and street installations.

In response to the various needs for increased illumination, Sherron Metallic Corp. has developed a new line of outdoor telephone booths offering many different possibilities. According to the manufacturer, the many new features available in the models are designed integrally into the structure of the booths and in accord with the basic theme, resulting in attractive complete units of balanced appearance. The manufacturer's designs are based on a cross-section of suggestions and opinions.

The new booths are designated as

the Model 1 17-S Type 7 and the Model 40-S Type 7, respectively following the basic design of the standard 30″ x 30″ booth and the larger 40″ x 30″ directory facility booth. They retain all the sound features of the standard construction and differ only in the entirely new ceiling and upper structure.

The upper panels on the front and two sides are equipped with translucent plastic "Telephone" signs. These signs are illuminated from within, and for this purpose the panels are provided with cut-outs covered by screening for insect protection. The signs themselves are made of high light transmission acrylic plastic with fused letters of the same material. The standard signs have red letters on white background, representing the best combination of attraction and legibility.

For increased interior illumination, a ceiling light of translucent acrylic plastic is provided. This is of large size covering better than half the ceiling area and distributes the light evenly throughout the interior of the booth. The plastic section is mounted in a hinged frame, which allows the additional advantage of access for all wiring and servicing to be performed from within the booth. In normal use the hinged section is secured by recessed locking screws.

While these new model booths may be equipped with the conventional flat and peaked roofs, they particularly lend themselves to the fullest applications of outdoor lighting when equipped with the translucent plastic "Astra-Dome" roofs.

FIGURE NINE—New outdoor telephone booth.

These are made in full sizes for both the Model 17 and the Model 40 booths. The dome is made of high light transmission acrylic plastic sealed in a weather-proof metal frame which fits directly to the roof mountings of the booth. The smooth, spherical shape of the dome affords no surface for dirt to collect and the frame is pitched to carry all drainage off to the rear. While the standard domes are made in white translucent material, colored domes for distinctive identification have also been shown.

A feature worthy of note with the new model booths is that all illumination for ceiling, signs and dome comes from a common incandescent light source within the booth. Excellent results are obtained with the use of a single 100 watt bulb in the Model 17-S or two 75 watt bulbs in the Model 40-S. Another feature is the "Lite-o-matic" photo electric light control switch. This unit is concealed within the ceiling assembly of the booth completely wired into the lighting circuit. A directional light shield tube is provided between the front panel and the photo-tube unit preventing its operation from stray light beams such as automobile headlights. The light admission opening itself is ingeniously protected by a clear plastic insert in the front sign. A light sensitivity control is provided whereby adjustment can be made to suit varying operating conditions in service.

The new Model 17-S Type 7 and Model 40-S Type 7 are available in all the attractive Sherron standard finishes of Red, Orange, Yellow and Green. As before, Dupont baked enamel finishes are used exclusively.

These new model booths are offered as an addition to the Sherron line and it should be noted that the Model 17-S Type 1 and other standard models will be available as before. A new catalog covering all models and optional equipment, and including detailed drawings and specification data, which will be helpful in the planning of new installations, is available from the manufacturer.

Wiremold "Pancake" Telephone Raceways

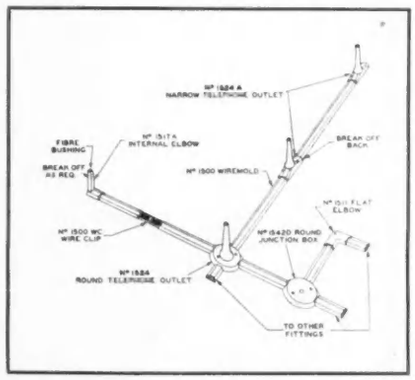


FIGURE TEN — Showing various fittings designed to be used with the No. 1500 model "Pancake" Raceway. Similar fittings are available for the No. 2600 model.

ALTHOUGH MOST modern office buildings have permanent conduit systems designed to bring telephone set wirings to desk and office locations, there are still many buildings where such wiring must be brought over the floor to the desired locations. The Wiremold "Pancake" raceways are designed to protect the wiring in these situations.

The sketch in *Figure* 10 covers the typical over-floor wiring layout details common to telephone installations in offices and commercial buildings. The Wiremold "Pancake" raceway, with few simple fittings, meets all code and telephone company requirements for this type of work, while offering advantages in speed and simplicity of installation. Carefully designed fittings provide for connection to existing underfloor ducts, floor boxes, or other Wiremold Raceway Systems already installed.

The raceway cover which provides a flat and trip-proof, unobstrusive construction can be snapped in place over the base. It can be easily removed by prying up with two screw drivers, one about six inches ahead of the other.

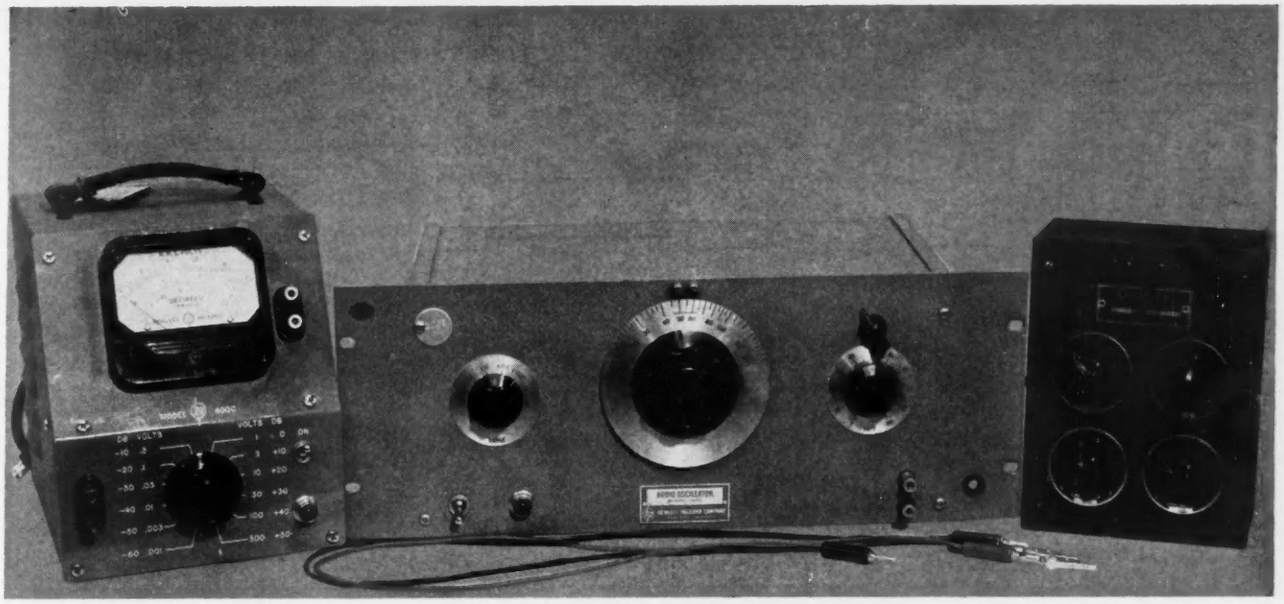


FIGURE ONE:—A vacuum tube voltmeter, an oscillator, and a decade resistance box such as shown here, can be used for making transmission loss measurements.

OPEN WIRE LINE MEASUREMENTS AT CARRIER FREQUENCIES

By G. L. CURTIS

This article describes and explains the tests necessary to determine carrier frequency transmission loss and illustrates how the tests can be accurately made with commonly available test equipment.

INCREASED TRAFFIC and the high cost of new line construction are causing many Independent telephone companies to consider the application of increasing amounts of carrier equipment to existing open-wire toll facilities. Many existing open-wire leads are capable of handling one or two carrier systems which use frequencies higher than the lines were originally designed to transmit. An important step in planning the use of carrier over such facilities is the measurement of transmission loss over projected line sections.

Although measurements at carrier frequencies are often thought of as being difficult and requiring complex and expensive measuring apparatus, they can be made very simply with inexpensive instruments that would have to be purchased, in any event, for the normal maintenance of the carrier equipment to be installed. The purpose of this article is to describe and explain the tests necessary to determine carrier frequency transmission loss and to show how they can be accurately made with commonly available test equipment.

The test equipment required to measure transmission loss includes a signal source and a means of detecting the signal at the receiving end. A variable frequency oscillator capable of generating the same range of frequencies used by the carrier equipment and with sufficient power output for convenient measurements should prove adequate as the signal source. Two vacuum tube voltmeters having a wide frequency response and capable of measuring voltages in the range of 0.001 to 10 volts are also needed for detectors. It is desirable for the voltmeters to have a db scale although this feature is not absolutely necessary because loss in db can be determined from voltage measurements. In addition to an oscillator and voltmeters, a calibrated adjustable resistor such as a decade resistance box or an assortment of resistors of known value are useful for calibrating the oscillator. With this small amount of test equipment, all the necessary information for determining the transmission loss of a line at carrier frequencies can be obtained. *Figure* 1 shows typical instruments that can be used for measurements at carrier frequencies.

Transmission Loss

WHEN A SIGNAL source such as a carrier terminal or oscillator is connected to a transmission line, the power received at the other end

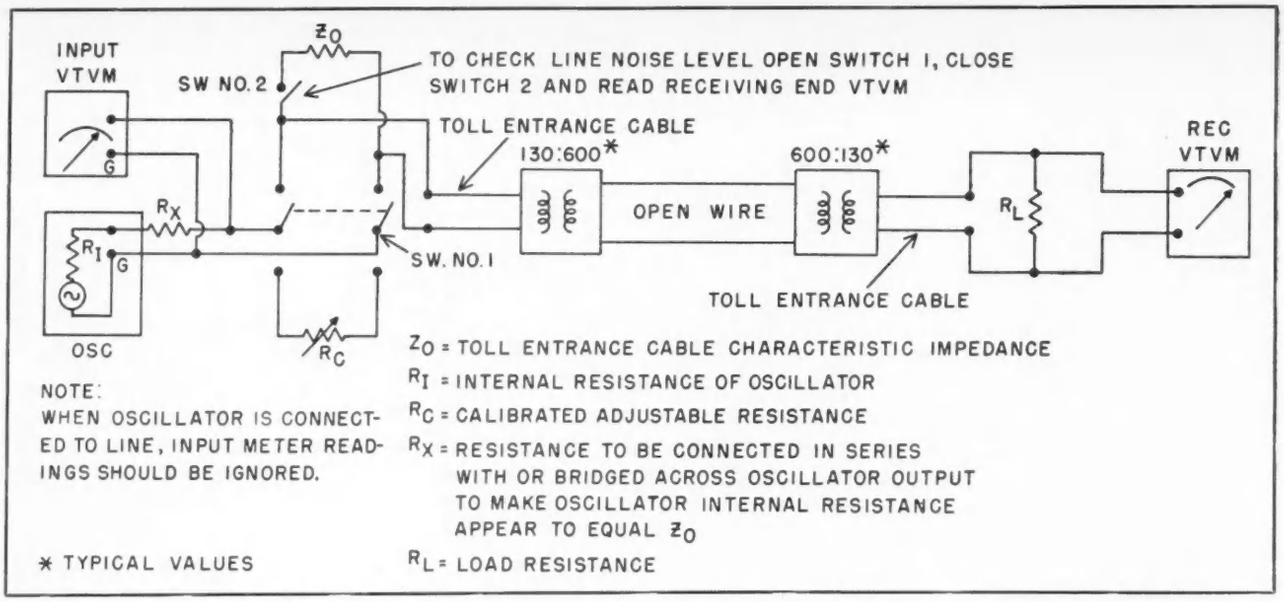

INPUT VTVM
SW NO. 2
Z_O
TO CHECK LINE NOISE LEVEL OPEN SWITCH 1, CLOSE SWITCH 2 AND READ RECEIVING END VTVM
TOLL ENTRANCE CABLE
130:600*
600:130*
OPEN WIRE
REC VTVM
R_X
R_I
G
SW. NO. 1
R_L
TOLL ENTRANCE CABLE
OSC
R_C
Z_O = TOLL ENTRANCE CABLE CHARACTERISTIC IMPEDANCE
R_I = INTERNAL RESISTANCE OF OSCILLATOR
R_C = CALIBRATED ADJUSTABLE RESISTANCE
R_X = RESISTANCE TO BE CONNECTED IN SERIES WITH OR BRIDGED ACROSS OSCILLATOR OUTPUT TO MAKE OSCILLATOR INTERNAL RESISTANCE APPEAR TO EQUAL Z_O
R_L = LOAD RESISTANCE
NOTE:
WHEN OSCILLATOR IS CONNECTED TO LINE, INPUT METER READINGS SHOULD BE IGNORED.
* TYPICAL VALUES

FIGURE TWO:—A typical arrangement of test equipment for making transmission loss measurements.

of the line is less than the power that would be received if the load were connected directly to the signal source. The ratio of the power received from a transmission line (by the receiving terminal) to the power originating from the sending equipment can be called "transmission loss" and is dependent on three factors. These factors are:

(1) The power dissipated by the line resistance as heat or radiated into space as radio waves.

(2) The power rejected by the line because of impedance mismatch at line terminations or at intermediate points.

(3) The power accepted by the line but transferred to other circuits or conducting material by magnetic and electric induction.

These three factors that determine transmission loss are independent and difficult to measure separately. Their combined effect, however, is relatively easy to measure with simple and inexpensive instruments. *Figure* 2 shows a simple test set-up that can be used to measure transmission loss.

Determination of transmission loss requires the measurement of *available* power at the transmission line input and the power actually delivered to the receiving end equipment. The available input power is fixed by the internal resistance of the oscillator and the setting of the oscillator output control.

Impedance Matching

To obtain valid results when measuring carrier frequency transmission loss the impedance matching conditions between the oscillator and the line must duplicate, as closely as possible, the impedance matching conditions that will exist when the carrier equipment is installed. In the usual case open wire lines are connected to a length of toll entrance cable at each end to bring the circuit into the telephone office. For carrier, a non-loaded pair in the toll entrance cable is commonly used for this purpose. The junction of the open wire pair with the toll entrance cable results in an impedance mismatch, the severity of which depends on the length and type of cable. If the length of the cable is very short (less than 100 feet), the impedance mismatch may be tolerable. Longer lengths frequently cause reflection losses too large to be neglected.

The author, G. L. CURTIS, is applications field engineer for the Lenkurt Electric Co., San Carlos, Calif.

Usually the carrier installation includes a line filter and impedance matching transformer at the terminal pole to separate the voice and low frequency carrier from the high frequency carrier and match the open wire to the non-loaded pair of the entrance cable. However, since it is assumed in this article that the transmission loss measurements are to be made prior to the purchase of the carrier equipment, this line terminating equipment may not be available. Omission of the line filter will have little effect on the results. However, for those installations where the toll entrance cable is too long to be considered negligible, it will be necessary to either obtain suitable impedance matching transformers or make the transmission loss measurements on the open wire and toll entrance cable separately. Impedance matching transformers having the proper insertion loss and frequency response characteristics can be obtained from the carrier manufacturer or his distributor at minor cost.

Test Oscillators

TO DUPLICATE the impedance matching conditions that will exist when the carrier equipment is installed, the oscillator internal resistance must duplicate the impedance of

the circuit it simulates. Depending on the make and model of the test oscillator, its internal resistance may be anything from 20 to 1000 ohms. If the oscillator internal resistance is less than the characteristic impedance of the circuit it simulates, it can be increased by connecting a resistance of suitable size in series with one of its output terminals. If the oscillator impedance is greater than the impedance of the circuit it simulates, it can be reduced by connecting a resistance of suitable value directly across its output terminals. A simple diagram and formula for determining the amount of resistance to connect across the output of the oscillator are shown in *Figure* 3.

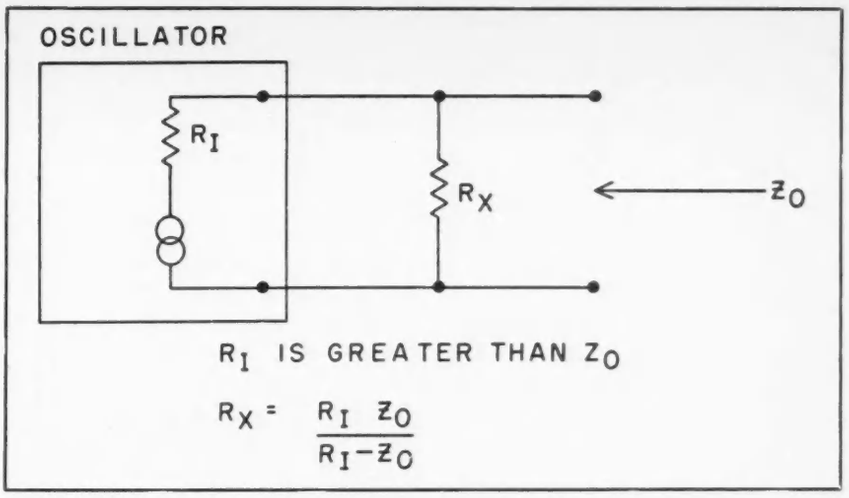


FIGURE THREE:—If the internal resistance of the oscillator is greater than that of the circuit it simulates, this diagram and equation can be used for determining the proper value of resistance to connect across the oscillator output terminals.

If the internal resistance of the test oscillator is unknown, it can be measured quite simply as follows:

(1) Measure the open circuit output voltage of the oscillator.

(2) Load the oscillator with a calibrated, adjustable load resistance across its output terminals.

(3) Vary the load resistance until the voltage measured is one-half the open circuit voltage. The load resistance is then equal to the internal resistance of the oscillator.

This method, though very simple, may not give accurate results on oscillators having an internal resistance below 100 ohms. Some of these oscillators have a distorted wave form when loaded too heavily. Their output voltage cannot be determined accurately because most vacuum tube voltmeters read accurately only when the measured quantity has a sinusoidal wave form.

If the oscillator internal impedance is found to be a low value, the accuracy of the measurement can be readily checked by the following procedure:

(1) Measure the open circuit voltage of the oscillator (Voc).

(2) Load the oscillator with a resistance of known value (RL). A good value to use is one which reduces the output voltage (VL) to about ⅔ the open circuit value.

(3) Measure the output voltage of the loaded oscillator.

(4) Compute the internal resistance (Ri) of the oscillator from the equation:

$$Ri = RL\left(\frac{Voc}{VL} - 1\right)$$

where RL is the load resistance and VL is the voltage drop across the load resistance.

This method of measuring internal impedance is a general method that will be satisfactory in nearly every case. In fact, this procedure can be used to determine the internal impedance of a great many electronic devices having a sinusoidal or d-c output voltage.

With the oscillator internal resistance properly matched to the desired impedance, the available power can be set to the desired value by the use of a calibrated resistor adjusted to equal the line characteristic impedance. The desired available test power is set by substituting the calibrated resistor for the transmission line and adjusting the output of the oscillator to provide the desired power output.

If desired, the oscillator open-circuit voltage required to establish a given test power can be determined from the equation:

$$Voc = 2\sqrt{P \times Ri}$$

For example, if the internal resistance of the oscillator has been adjusted to 130 ohms and test power of 1 milliwatt has been decided upon, the open circuit voltage of the oscillator can be computed from the above equation and found to be 0.72 volts. With this value of open circuit voltage, the oscillator can be connected to the line to provide a test signal of known power.

In addition to calibrating and matching the oscillator to the input of the transmission line, the load resistance at the receiving end must also be equal to the impedance of the carrier equipment that will be connected to the line. This is necessary so that the impedance match between the line and load resistance will be the same as the impedance match betwen the line and the carrier terminal to be installed.

The transmission loss is measured by connecting the calibrated oscillator to the line input, varying its frequency over the desired range and determining the power received at the other end of the line. Measurements should be made at intervals of 2 to 4 kc for both directions of transmission because the loss in one direction may be different from the loss in the other direction. Since open-wire carrier systems normally use different frequency bands for the two directions of transmission, it is sometimes possible, where coordination is not necessary, to arrange the terminal equipment to take advantage of differences that may occur between the transmission losses for the two directions of signal flow.

Units

IT IS CUSTOMARY and generally more useful to express transmission loss in decibels. However, it is not always convenient to make transmission loss measurements directly in db. Many vacuum tube voltmeters have a db scale that reads 0 db when the voltage is 0.775 volts. Others read 0 db when the voltage is 1.73 volts. Still others may have different db scale markings or none at all. Regardless of the scale markings of the instruments, transmission loss can be readily determined in db by use of the nomograph in Figure 4. With this chart the power available from

the oscillator, expressed in dbm, can be found by locating on the voltage and impedance scales the points corresponding to one-half the open circuit voltage and to the internal resistance of the oscillator. A straight line drawn between these two points intersects the dbm scale at a point corresponding to the power level, in dbm, available from the oscillator. The received power can be found by drawing a line between points on the voltage and impedance scales corresponding to the measured line voltage at the receiving end and the load impedance. The intersection of this line and the dbm scale gives the power received in dbm and the difference between the two dbm values is the transmission loss of the line.

Since the available test power is held constant by adjustment of the oscillator output control, its value in dbm does not have to be redetermined from the nomograph for each individual measurement. However, the received power in dbm must be determined at each frequency for which the transmission loss is measured. Use of the nomograph for each individual measurement would be slow and inconvenient. If the receiving end meter has a db scale, the nomograph can be used to determine a correction factor to be applied to this scale. Then all the received power measurements can be made by reading the db scale of the voltmeter. The actual reading of the receiving end meter plus the correction factor gives the received power in dbm. For example, if the load resistance is 130 ohms and the db scale of the meter is marked so that 1 volt corresponds to 0 db, the nomograph shows that 1 volt across 130 ohms is +9 dbm. Then every reading of the db scale of the meter when connected across 130 ohms can be corrected to dbm by adding +9 to the reading. The correction factor for any db scale for any load resistance can be determined in the same manner.

In some cases, use of the nomograph or other charts and graphs is not necessary. If the voltmeter used at the sending end and the voltmeter used at the receiving end have the same scale markings, and the internal resistance of the oscillator and the receiving end load resistance are equal, the transmission loss can be determined without converting to dbm. The input power level can be determined by reading the db scale

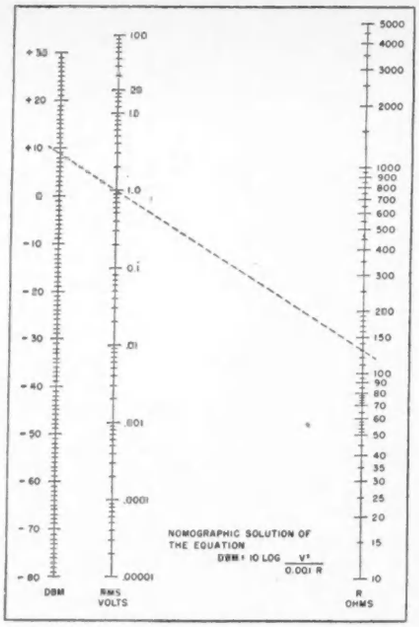


FIGURE FOUR:—A nomograph for determining dbm from voltage measurements across known impedances.

of a meter connected to read the open circuit voltage of the oscillator. The received power level can be read on the db scale of the receiving end meter and the transmission loss is the difference between the two readings minus 6db. The correction factor of 6 db is required because the power available to the line is proportional to $(\frac{1}{2}Voc)^2$ which is 6 db less than the meter scale reading corresponding to Voc.

Sources Of Error

ASIDE FROM purely human error such as misreading instruments, improper connections, etc., and errors caused by test equipment imperfections, the chief source of error is the introduction of extraneous voltages (noise) into the circuit from external sources. On long circuits the error from this source could be considerable unless precautions are taken to reduce it as much as possible.

The simplest and most expedient precaution is the use of a test tone of sufficient power to override the noise by a large margin. If available, a frequency selective voltmeter can be used. Such instruments permit detection of very narrow bands of frequencies and thus eliminate most of the extraneous noise voltages from the measurement. If, however, a frequency selective meter is not readily available, an ordinary wide frequency response vacuum tube voltmeter can be used and the desired signal separated from the noise by the use of a suitable table, graph or equation.

To separate the desired signal voltage from any noise that may be present, the oscillator at the sending end of the line should be replaced with a resistance equal to the characteristic impedance of the toll entrance cable or open-wire line as applicable. Under these conditions, any voltage that appears across the receiving terminals is caused by noise. If the total voltage measured across the load resistance (combined signal and noise voltages) is 15 db or more greater than the noise voltage alone, the total voltage can be taken as the desired

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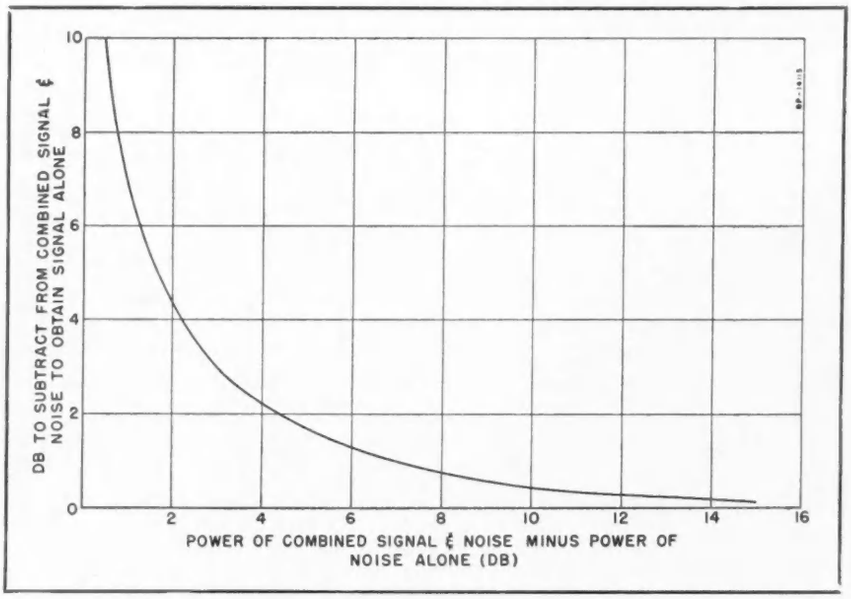

FIGURE FIVE:—Graph for separating signal from noise when making transmission loss measurements

NEW MATERIALS and NEW EQUIPMENT

By JOHN G. REYNOLDS

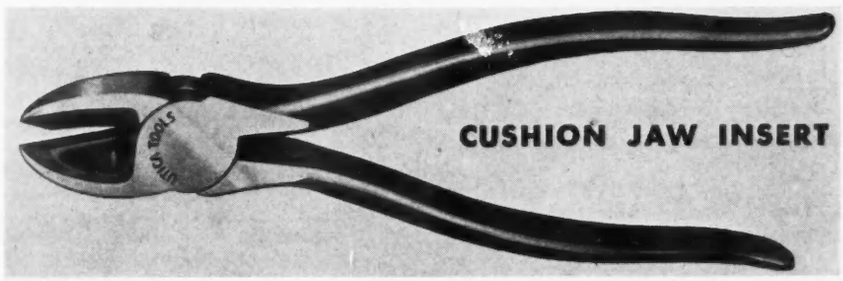

FIGURE ONE (left) — This Cushion Throat insert is featured in Utica diagonal and side cutting pliers.

Cushion Throat Insert In Pliers Holds Wire End

A NEW CONVENIENCE and safety idea in cutting pliers is the "*cushion throat*" now being introduced by the Utica Drop Forge & Tool Corp. in pliers used for cutting electrical or spring wire. This cushion throat insert acts as a third hand to hold the short end of the wire during and after cutting.

The "cushion" is tough, rubbery red Plastisol, which, as illustrated in *Figure* 1, is bonded in the throat around the pliers' cutting edge. As the pliers close, the Plastisol cushion grips the short end of the wire very tightly, holding as the cut is made. Generally, the pliers must be opened to release the cut wire end.

According to the manufacturer, this type of pliers has been made on special order and safety-tested by many industrial plants over the past few years. They have proved valuable in electronics work where cuts can be made inside a chassis without danger of the snips of wire falling into the set. On "live" work, this helps prevent short circuits. When cutting springy wire, this safety feature keeps wire from flying.

Retractable Wheel Chock Holds Truck Safely

A UNIQUE NEW alloy steel wheel chock, which retracts away from the wheel, regardless of how tightly the tire wedges against it, has recently been introduced by Calumet Steel Castings Corp., 1636 Summer Street, Hammond, Indiana.

The Casteel Retractable Wheel Chock, illustrated in *Figure* 2, is constructed with alloy steel castings of high tensile strength, and is designed to hold any truck, trailer or tractor safely spotted in parked position. Operation of the retracting feature is simple: when it is desired to release the Chock, the combination trip lever and handle is depressed, causing the face or bearing plate of the Chock to pull back away from the tire. Because of this backward movement, no amount of wedging action can affect the Chock's retraction in removal. A positive safety lock prevents premature retraction.

During loading, as weight is added to a truck or trailer, its tires tend to flatten and exert pressure against the blocks. In such cases, ordinary wood or fixed position block are extremely difficult to remove.

This retractable wheel Chock should solve the problem of holding telephone construction or maintenance trucks on grades or maintaining them in position while setting or removing poles with the truck derrick, or while pulling-in line wires or cable with the power winch.

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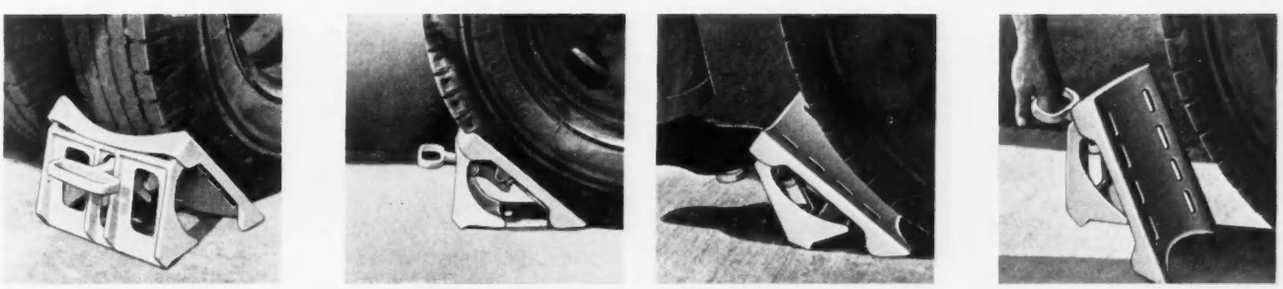


FIGURE TWO — The Casteel Retractable Wheel Chock. (a) Chock in position. Note wide bearing for full width tire contact. (b) Long base of Chock provides extra holding power. Wide rear support keeps Chock from sinking in sand or clay. (c) Chock is retracted by stepping on trip handle, which causes Chock to move backward from the tire. This counteracts wedging action of tire and assures safety of operation. (d) In the retracted or collapsed position the Chock is easy to handle or store.

Kester Acid-Core Solder

Meets all general soldering requirements.

Easy to use. Saves time and labor. Makes long-lasting job.

Furnished in 1 and 5-pound spools.

Kester Plastic Rosin-Core Solder

Very efficient solder for all electrical and radio work, automotive work, etc.

It eliminates all possibility of corrosion, resistance or leakage.

Plastic rosin enables the user to solder perfectly and with ease.

Furnished in 1 and 5-pound spools.

Kester Stearine Flux-Core Solder

Contains an organic type flux.

It is an intermediate between rosin and acid flux-core solders.

Suitable for spot or quick soldering.

Furnished in 1 and 5-pound spools.

Kester Solid Wire Solder

Uniform in gage and alloy.

The same high quality in metals and fabrication found in Kester flux-core solders.

Every spool carries positive alloy identification.

Furnished in 1, 5 and 20-pound spools and 50-pound reels.

Dutch Boy Solid Wire Solder

Available in 50 per cent tin and 50 per cent lead or with 40 per cent tin and 60 per cent lead.

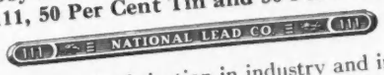
Wire solder is simply regular solder extruded or drawn to form wire. It is used where numerous ganged small pre-fluxed parts are involved, where straight-line production methods can be set up, etc.

Furnished in the following wire sizes: 12, 10, 9 and 6. Supplied wound on 1, 5, 10, 25 and 50-pound spools.

National Lead Bar Solder

Dutch Boy Brand—with Numbered Bars and Ingots

No. 111, 50 Per Cent Tin and 50 Per Cent Lead

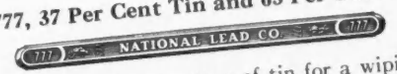


Used for all metal fabrication in industry and in shop.

Made of selected lead and tin mixed in equal parts. Bright, strong and completely free from impurities. Flows easily, keeps fluid at practicable working temperatures, promotes rapid tinning, covers well and has high adhesion. No cracking on set; joint has high fracture resistance.

Brinell hardness No. 12.3. Density, 8.85. Liquidus, 421°F. Pasty range, 60°.

No. 777, 37 Per Cent Tin and 63 Per Cent Lead

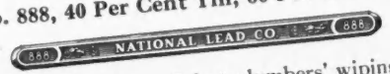


Has unusually large percentage of tin for a wiping solder. When used for this purpose, it can be reduced slightly with more lead.

Brinell hardness No. 13.3. Density, 9.24. Liquidus, 450°F. Pasty range, 87°.

Furnished also in 5-pound ingots.

No. 888, 40 Per Cent Tin, 60 Per Cent Lead



Ideal for cable splicing. Select plumbers' wiping solder, always uniform, with wide pasty range and good tinning properties. Wipes joint that will not sweat and has butter-like consistency with no coarseness or graininess.

Brinell hardness No. 13.3. Density, 9.33. Liquidus, 453°F. Pasty range, 92°.

Furnished also in 3-pound ingots.

Nokorode Soldering Paste

2-Ounce Can

Will flux all metals except aluminum. Takes the place of acid in all soldering work.

Absolutely non-corrosive, safe as resin and rapid as acid.

Not affected by heat and does not spatter.

The solder will not turn dark after using, and the work has high tensile strength.

Available in 2-ounce cans, packed 12 to carton; 1-pound cans, packed 6 to carton; in 10, 25 and 50-pound cans packed individually, and in 100-pound drums.

Allen Soldering Paste

A corrosion-free, soft form of soldering flux.

Adheres to surface during operation. Assures secure electrical and mechanical joints. Triples strength of solder.

Carries official Underwriters' approval.

Allen Soldering Sticks

An economical rapid flux. Just a touch to the hot metal does the work. Allen formula carries official Underwriters' approval.

Fuses the solder rapidly without fuss, muss or after-corrosion. Size, 1x5¼ inches. Standard formula.

LEICH

More products you know are dependable...

through Leich Supply Service

KESTER
ACID CORE
SOLDER

National Lead's famous Dutch boy solder and Kester's rosin core solder need no introduction to telephone folks. Both of these fine products have long been relied upon for their uniform high quality. Practically all of the products in the complete Leich line of supplies and construction materials have such good reputations. It's not by chance either. We know that you save time, work and money by using tools and materials of the highest quality.

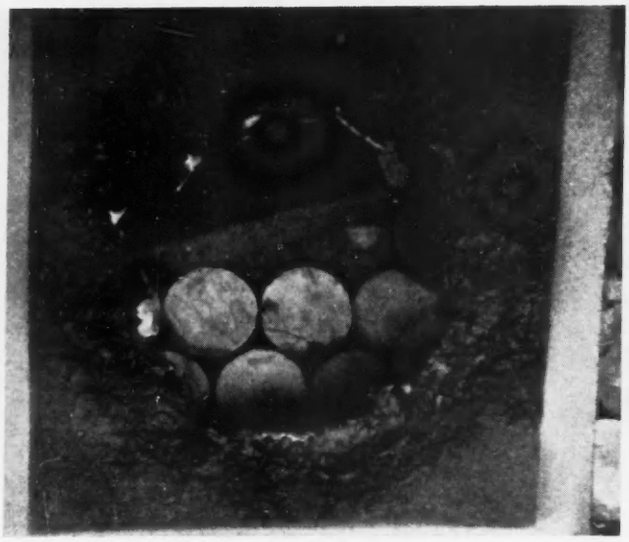
Look through your Leich Catalog (the one with the bright yellow cover). You'll find famous products by respected manufacturers to fill your every need.

Order what you need . . . give us a chance to prove that you'll like our service as well as our products. Leich Sales Corporation, 427 W. Randolph, Chicago 6, Illinois.

Page 81 from the Leich Catalog

MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

GENERAL TELEPHONE SYSTEM



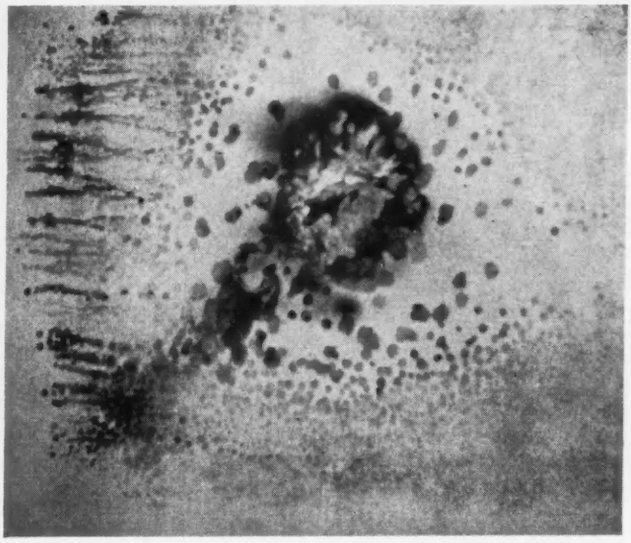


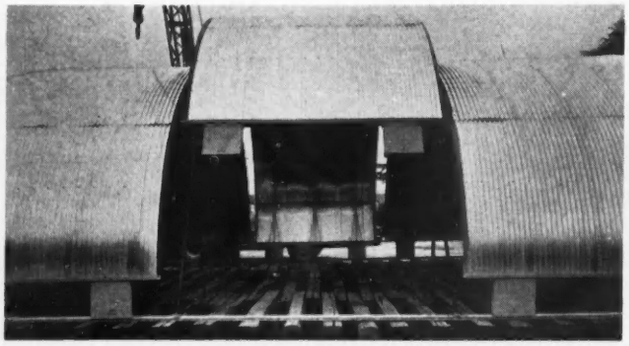
FIGURE THREE — This test shows effectiveness of the Fyr-Kote paint in preventing spread of fire. (a) This light unpainted board was very inflammable. It flared and burst into flames and burned thin. (b) This light board was painted with Fyr-Kote which prevented the board from flaming and retarded the fire. Fyr-Kote also provides a durable paint finish.

New Fire Retardant Paint

IT IS A WELL KNOWN fact that ordinary paints applied to wood or composition board only make these materials more flammable. The development of a new fire retardant paint, marketed under the trade name of Fyr-Kote, makes it possible to coat combustible surfaces with a durable, attractive finish that is resistant to fire. This new product is easily applied with brush or spray equipment. It is claimed to be particularly adapted for interior painting of all types of wall surfaces since it not only gives fire safety, but provides a very durable paint finish that is claimed to withstand more than 25 cycles of scrubbing with strong detergents and boiling water.

The Fyr-Kote oil base interior flat wall paint has been listed by Underwriters Laboratories. Tests such as those illustrated in *Figure* 3 show that surfaces painted with Fyr-Kote smolders and smothers when reached by flames. This paint releases a combination of carbon dioxide and calcium chloride that controls the flames.

Portable Shelters for Yards



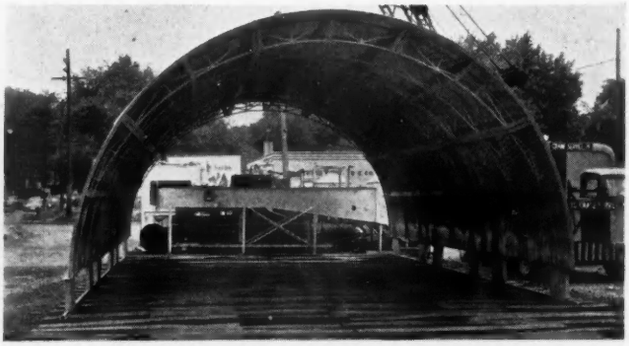


FIGURE FOUR — Details of the Yard-Stor Shelter. (a) Tilted for each access. (b) Interior view, with side skirts removed when required for extra ventilation to avoid condensation characteristics of heavy equipment in storage.

HEAVY MACHINERY and equipment are often relegated to open yard storage because of the difficulties of handling and the general lack of inside space. Yard work operations may need shelter from the weather.

The Yard-Stor Shelter is a metal storage building, not unlike a conventional hut in appearance, but with the difference that it is sectional and may be mounted on a track for sliding apart to move heavy equipment or materials. The sections may also be tilted from either side if required for easy access or may be telescoped to expose the entire contents of the shelter, and all its sections may be nested at the ends.

The Yard-Stor Shelter, as illustrated in *Figure* 4, may be set up on railroad ties to support the rail tracks on which the sections roll, and the stored equipment. The ties are laid on a bed of cinders and more cinders may be spread to bring the ties flush with the grade. The sections consist of 8 ft. x 12 ft. curved panels bolted together. Wheel blocks are attached to the ends on the sections to ride on the rails.

When it is not necessary to move the sections except on occasion, the Yard-Stor Shelter sections may be set up over the equipment or working area and rested directly on the ground.

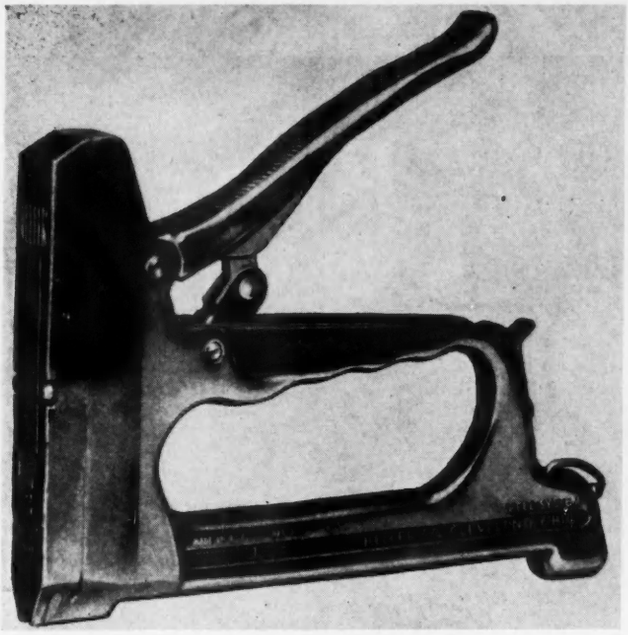


FIGURE FIVE — New Heller Model "TM" Tacker. New features are a front latch to hold lower front cover in place, and a window in the magazine frame to expose the staples to view.

New Model Stapler For Fastening Insulated Wire

AUTOMATIC TYPE STAPLERS for fastening station wiring have been in use for some years. The Heller Company of Cleveland, Ohio has recently introduced a new model of its automatic stapler called the Heller Model "TM" Tacker. This is a hand tool with a spring actuated hammer for driving staples fed from a magazine in the tool.

The new tool differs from the older types in that it uses barbed staples ("TM" Sureclinch) which are one-half the width of the earlier type of staple. As indicated in *Figure* 5, the tool also has a front gate latch instead of a wire spring to hold the lower front cover in place, and prevent it from dropping off inadvertently. In addition, a window has been incorporated in the frame to show the number of staples left in the magazine.

Heller "TM" Sureclinch barbed staples (in brown and ivory) are furnished in standard packages of 2000 in one color — each package holding 4 individual packs of 500 (40,000 in the standard shipping container).

The "TM" barbed staples are used for fastening jacketed wire to wood, plaster, plaster board, and composition wall board materials. Experience has indicated that when Heller "TM" barbed staples are used to fasten JKT wire to plaster walls, they possess adequate holding power. The "TM" Tacker, and "TM" Sureclinch barbed staples can also be used to fasten two and three conductor twisted wire.

It is recommended that the staples be spaced approximately 7½" apart. This spacing may be increased in runs in unfinished basements, closets, and other locations where wire run is inconspicuous. The slack in the wire should be taken up as the stapling proceeds.

The staples will hold jacketed wire firmly on all types of surfaces, also #14 ground wire. When it is desired to withdraw a staple, this may be done with diagonal pliers, taking care not to mar the wire or the woodwork. It is not advisable to attempt to withdraw staples driven into plaster, plaster board, or composition wallboard material.

When appearance of the wiring run is important, routes should be chosen to conceal the wire from view as much as possible. Where the wiring is exposed to view, the wire should be run along baseboards, in corners, and along door frames. If wires must be run across joists in cellars, it should be spaced at the closest possible interval, and should be stapled following contour of joists and floor boards, not spanning the joists.

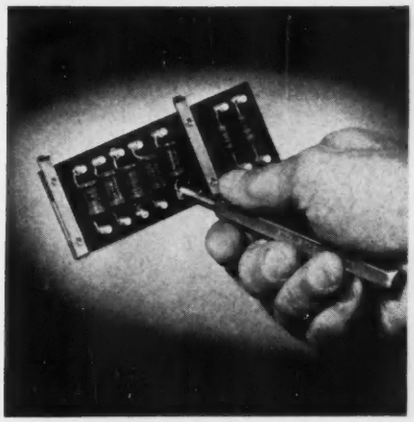


FIGURE SIX — "Wire-Wrench" wraps wires around terminals for soldering.

New Tool Wraps Wire Around Terminal

THE "WIRE-WRENCH" (shown in *Figure* 6) is a new tool designed for wrapping wire around terminals and is manufactured by Contact, Inc., 238 Main Street, Cambridge, Massachusetts. This simple tool is used for wrapping either stranded or solid wire around terminals on boards or hermetic seals. One or more wires can be wrapped around a terminal with a single twist of the wrist.

The tool is used in the following manner: (1) the wire is placed against the terminal; (2) the tool is placed over the terminal so that the wire is caught in the notch of the tool; (3) a simple twisting motion is applied, wrapping the wire around the terminal.

Improved Wheatstone Bridge Test Sets

FIGURE SEVEN — New Winslow Wheatstone Bridge Test Set.

NOW AVAILABLE to perform a wide variety of tests normally made by telephone companies, public utilities, railroads, educational institutions, and electrical equipment firms, are new Wheatstone Bridge Test Sets manufactured by The Winslow Co., Inc. 9 Liberty St., Newark, N. J.

The new units (*See Figure* 7.),

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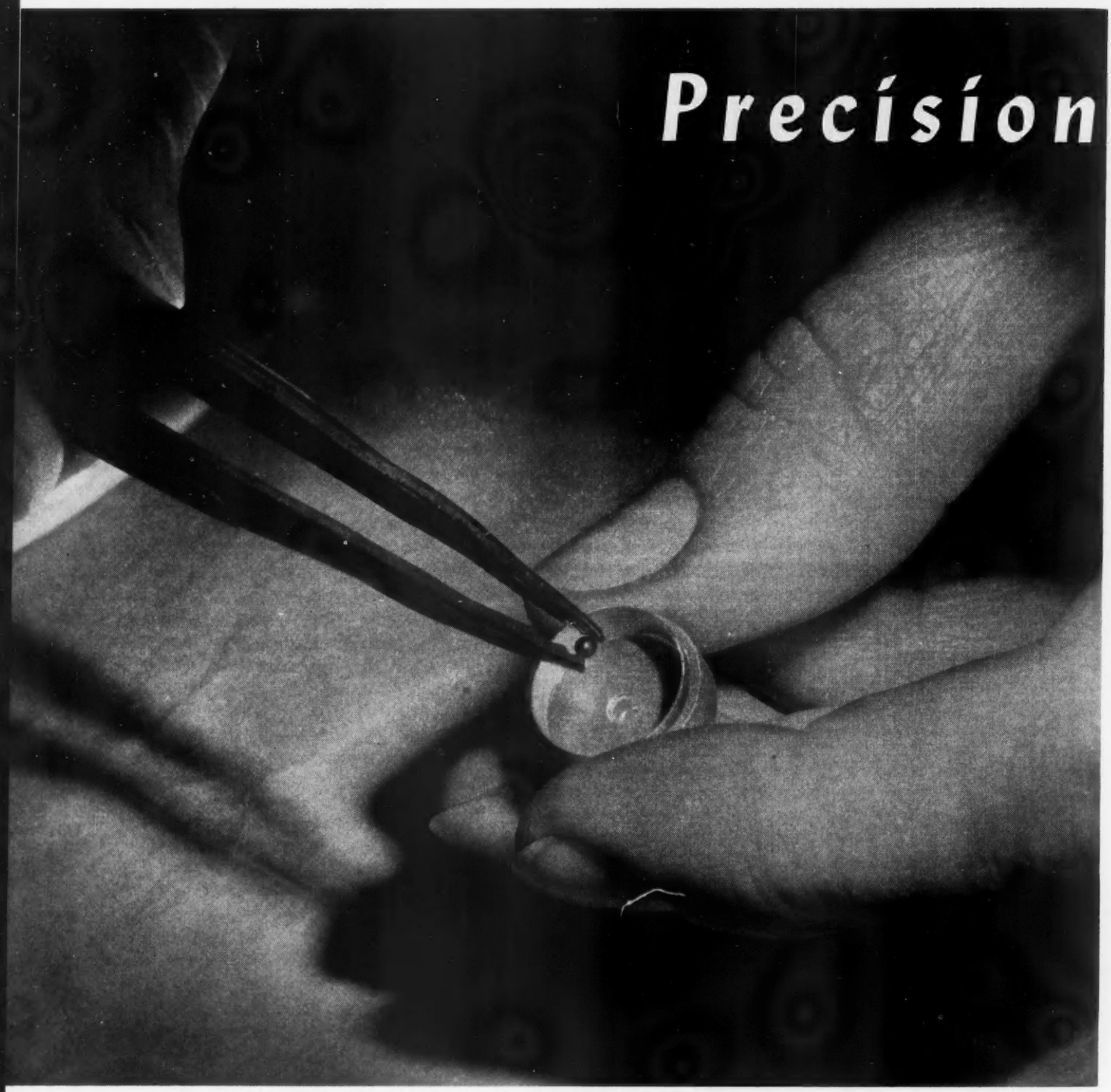


Insertion of ball bearing into governor cup during manufacture of Type 51 Dial.

PREPARE for Nationwide Numbering the Economical way! Order a supply of metropolitan number plates now and replace your present plates as you make routine trips for installation and servicing.

...*rings* UNPARALLELED DEPENDABILITY
...o Automatic's Type 51 Dial

Type 51 is the most trouble-free dial you can buy! Add to this its extraordinarily uniform impulsing, and you know why telephone men prefer it. . . . What you may *not* know is how we make Type 51 Dials so good. The secret is *precision!*

For instance, at the left you see an operation which is typical of many in the making of Type 51—an operation as exacting as many in the making of a fine watch. We start by choosing the finest materials. From them we machine vital components to precisely accurate contours. Watchfully, we examine each component, then check the dial at many points during assembly, and after completion.

This precision manufacture pays off for *you!* It minimizes maintenance and wrong numbers. It results in dollar savings and pleased subscribers. Talk with a man who uses Type 51 Dials; you'll soon be ordering them too!

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

Makers of Telephone, Signaling and Communication Apparatus • Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions: AUTOMATIC ELECTRIC SALES CORPORATION
Export Distributors: International Automatic Electric Corporation
1033 West Van Buren Street, Chicago 7, U. S. A.

(Continued From Page 59)

designated as Series 301 by the manufacturer, are compact — 8⅞″ x 7⅜″ x 5¾″ — and weigh approximately 8 lbs. including self-contained batteries. An accuracy of ± 0.1% ± 0.01 ohm is assured. For measuring resistance values above 100,000 ohms, an external battery may be used to insure high accuracy.

Besides resistance measurements, the units are especially adapted for easy location of line faults — opens, grounds, crosses, etc. Switches and terminals are provided for fast conversion of the Wheatstone Bridge circuit to Varley, Murray, Hillborn, Fisher, and other loop tests. In addition, the capacitance balance method of fault location may be used with the instrument.

Further speed in operation is attained by single-dial selection of all ratios. The galvanometer is protected from violent deflections or sudden surges, and rugged construction is used throughout so that accuracy is maintained whether the instrument is used in stationary or field applications.

Uses for Plastic Vinylite Sheeting

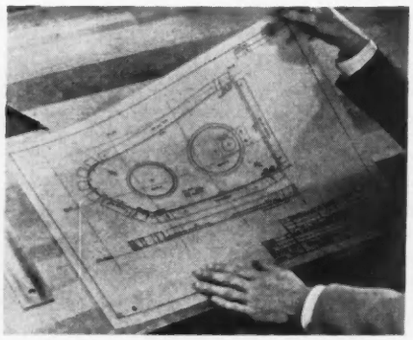


FIGURE EIGHT — Drawing sheet made from Vinylite plastic sheeting resists wrinkling cracking, fraying, and aging; and makes clear reproductions.

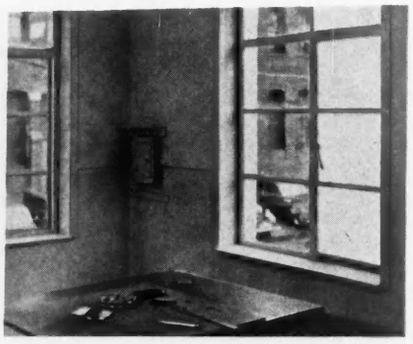


FIGURE NINE — Shade material made from Vinylite plastic sheeting. Left: This plastic sheeting can be applied to window panes by cutting to pane size and applying the sheeting directly to the pane. Right: This illustrates how the plastic sheeting reduces the glare from a window

PLASTIC SHEETING has a number of useful applications. Two of interest are shown above.

In *Figure* 8 is shown a durable new type of drawing material which facilitates the making and reproduction of engineering drawings by use of translucent Vinylite plastic rigid sheet. Exceptionally stable in dimensions, this plastic rigid sheet will not shrink or stretch; it is resistant to moisture, oil and grease, alcohol and most chemicals. Finger marks and smudges wipe off with a damp cloth. Border, title and information box, and grid lines are printed in reverse on the back of the sheet.

These grid lines and other printing facilitate making the drawing and reproduce clearly along with the drawing itself when the sheet is used as a negative to make copies, yet do not hamper the draftsman since they are on reverse side of the sheet. Stiff and crisp, at the same time pliable, the plastic rigid sheet lies flat or can be rolled up, and it resists wrinkling, cracking, fraying and aging. Erasures are easy to make, and entire drawings can be removed from a sheet which can then be re-used.

Windows admit sunlight without glare when the glass is covered with a new type shade made of Vinylite plastic sheeting (*Figure* 9.) Easily applied and removed and reuseable the shades are tough and strongly resistant to tearing, abrasion, scuffing, creasing and cracking. Vinylite plastic sheeting also resists moisture, mould and mildew, oils, greases, alcohols and many chemicals.

The new shade is particularly useful to reduce glare in drafting rooms and offices. Cut to windowpane size, Vinylite plastic sheeting is applied by wetting the glass, pressing the polished side of the shade against it, and squeegeeing out the water. Properly applied, the shade will stay in place as long as desired yet it is easily stripped off by merely prying up the corner with a fingernail. Washable on or off the window, the shade needs only to be rinsed in warm water to restore adhesiveness before re-use. Custom cut to required size, the new shades are available in eight colors, from frosted translucent to blackout black, to admit varying degrees of glareless light.

Resin-Base Paints Effectively Protect Exterior and Interior Walls

WIND, RAIN AND sun's heat that leaked through a deteriorated brick rear wall to threaten the structure of an old building are sealed out by an attractive new surface coating based on Vinylite resins, as illustrated in *Figure* 10. Bridging cracks and forming an unbroken surface, this Vinylite resin-base coating is flexible, durable and elastic enough to withstand structural strains without rupturing. Vinylite resins also make this easily washed masonry coating resistant to moisture, mould, mildew and industrial gases. Fully exposed to the south, the

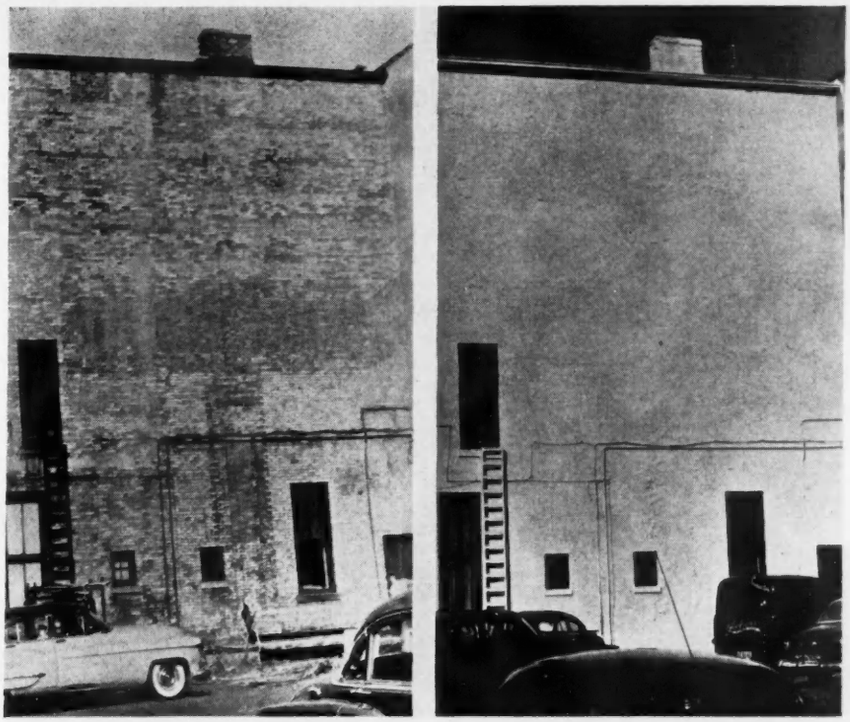


FIGURE TEN — Vinylite Resin-Based coating stops deterioration of masonry wall. Left: Building before coating was applied. Right: Improved appearance of building following application of coating.

deteriorated brick rear wall absorbed heat from the sun through most of the day and was in such poor condition that it endangered the interior surfaces of the building. Resurfaced with resin-base coating, the brick wall is completely sealed and reflects sunlight so well that the interior of the wall is now 10 to 15 degrees cooler on sunny days.

Vinylite resin-base paints are also used on interior walls. Walls of any material can be coated in this manner, and any surface scars resulting later can be touched up with a touch up gun to give the appearance of a complete repaint job, and appreciably reduce maintenance costs.

Another type of resin-base paint is compounded with Bakelite polystyrene latex which exhibits excellent color retention, rapid drying, chemical resistance, easy washability, and superior hiding power. They permit single-coat applications-sealing, sizing and finishing all in one.

The "hold-out" property and alkali resistance of Bakelite polystyrene latex coatings permits their use on fresh plaster which has set for only 24 hours. When pigmented with alkali resistant pigments, they can be used as one coat finishes on the "hot" plaster. Such paints are being used successfully in locations where walls are constantly wet.

In addition to water resistance, polystyrene latex-based paints possess a high degree of alkali, acid, and corrosive chemical fume resistance. Thus, they have been used as paints and coatings for the interiors of silos as well as interior paints for brick and concrete.

A continuous, homogeneous film is rapidly obtained upon air-drying, a quality that is essential to water proofness. Tests have shown that after only fifteen minutes of air-drying the film will not wash off or even soften appreciably in contact with water. The resultant coatings are tough and durable. They withstand scrubbing with soap solutions and washing compounds and are resistant to acids and alkalies.

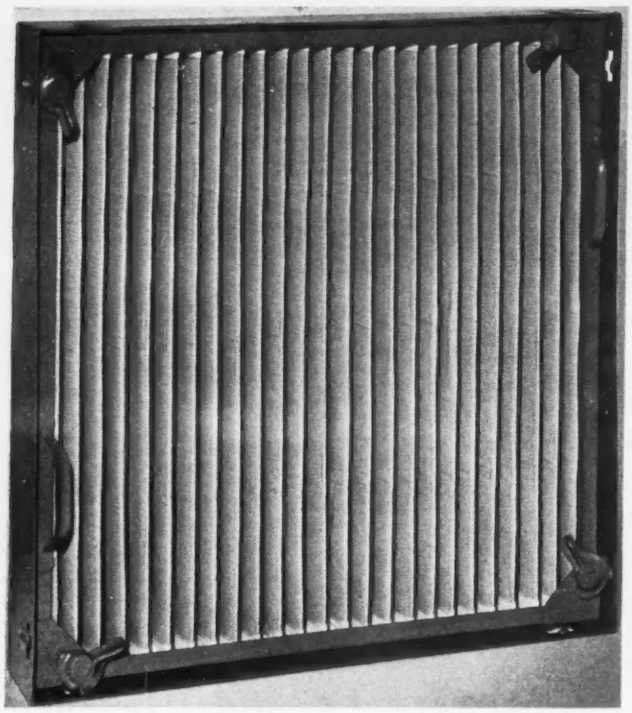
Ventilation and Air Conditioning Filter

THE DOLLINGER CORP., Rochester, New York, has developed a high-efficiency dry panel filter for heavy duty installations in ventilating and air conditioning systems as used in industrial plants and office buildings. This type of ventilating filter has a good application for central office building air conditioning and ventilating systems where dust and dirt must be kept out of switchrooms and operating rooms.

The Staynew dry panel filter is illustrated in *Figure* 11. It has a rugged construction and is designed for a wide range of filtering media. It is stated to be easy and economical to maintain.

The dry panel ventilation filter is available in a number of standard sizes and has fins either two, four or eight inches deep. Installation is facilitated by two lifting handles and four spring-loaded cam-type locking latches which securely fasten the cell into a 14 gauge steel frame. These frames can be riveted together to form a flat filter bank or series of V arrangements where space is limited.

Basic to Staynew construction is the use of a permanently mounted hot galvanized steel screen which has been fitted to the cell in the box portion of the filter to form a series of fins so designed that they provide a maximum filtering area in any given space with low resistance, unusual facility in servicing, and a high



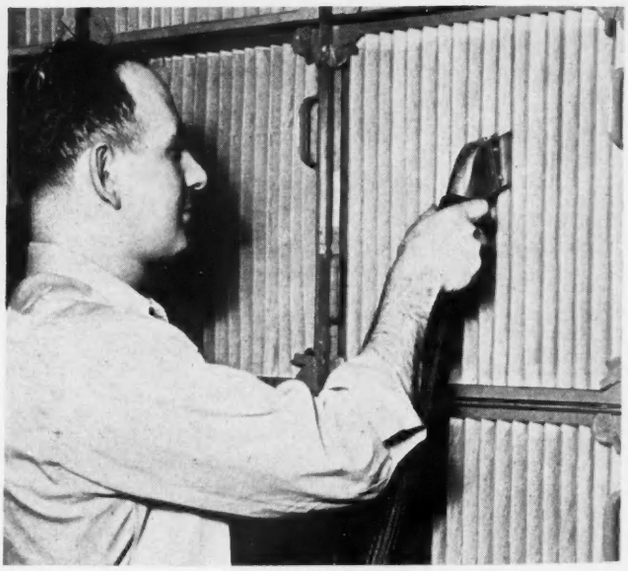


FIGURE ELEVEN — Dollinger Corporation Staynew Dry Panel Ventilating Filter. (a) The unit assembled. Cell is secured by spring-loaded locking cams. Frames are drilled for riveting together to form flat bank or series of V's. (b) The Staynew Dry Panel Filter can be vacuum-cleaned in place. This feature makes cleaning easy, saves time and reduces maintenance costs.

capacity for holding dust. Against this screen cloth, on the air-entering side of the filter, is fitted the pre-formed filtering element. This in turn is backed up by another screen of lesser gauge.

The effect of this design is that the filtering medium, crimped so that it forms a perfect fit with the permanent screen, lies between two protective layers of screen cloth. It is guarded on one side by the durable permanent form, on the other by the light but tough back-up screen. Thus the unit's design prevents damage even to the most fragile medium.

This dry panel filter operates with complete efficiency with nearly any filtering medium; any medium that comes in sheet form and can be crimped may be used. Pre-formed filtering media can be quickly and easily inserted wherever the filter happens to be installed. This factor removes the necessity of transporting unwieldy cells to servicing areas.

"Leak-tec" for Detecting Minute Leaks

FIGURE 12 — "Leak-tec" in plastic bottle for squirting on surfaces to detect gas or air leaks.

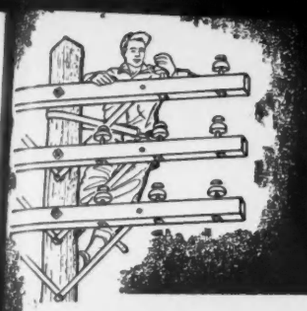
LEAK-TEC IS A sensitive liquid developed from a special formula for detecting the most minute leaks where gas or air is used. This fluid will detect leaks simply by squirting this material from a specially designed plastic bottle (*Figure* 12) on surfaces or around piping. It will penetrate cracks, and creeps over surfaces creating bubbles where the leak occurs. No brushing is required.

This fluid is stated to be non-inflammable, non-explosive and non-injurious to the person using it. LEAK-TEC is being used extensively by maintenance crews for gas installations, testing for leaks on gas filled electric cables and transformers, refrigeration and air conditioning equipment, and should have a good application for detecting nitrogen gas leaks in telephone cable and for testing cable splices after wiping to detect porous wipes by the gas pressure method.

Vacuum Cleaner Solves Conduit Pull Problem

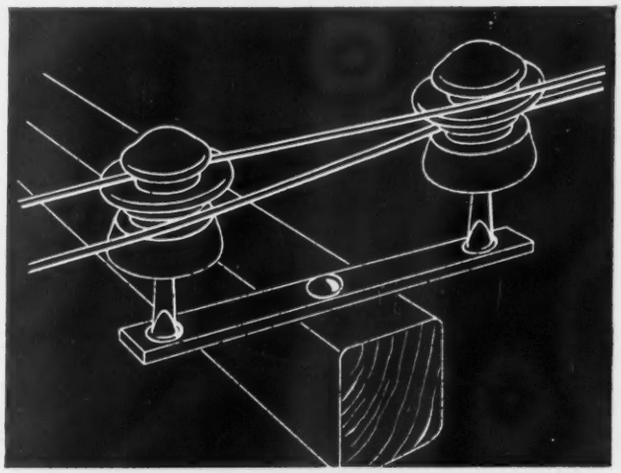
INSTALLERS have occasionally found that with the conventional fish tape they are unable to cope with bends in conduit placed for running inside wire or wiring cable. An ingenious solution is to employ a vacuum cleaner to aid in pulling a line through the conduit. A ball of cotton with sewing thread tied to it is inserted in one end of the conduit. The end of the cleaner's suction hose is applied over the other end of the conduit with rags stuffed around the

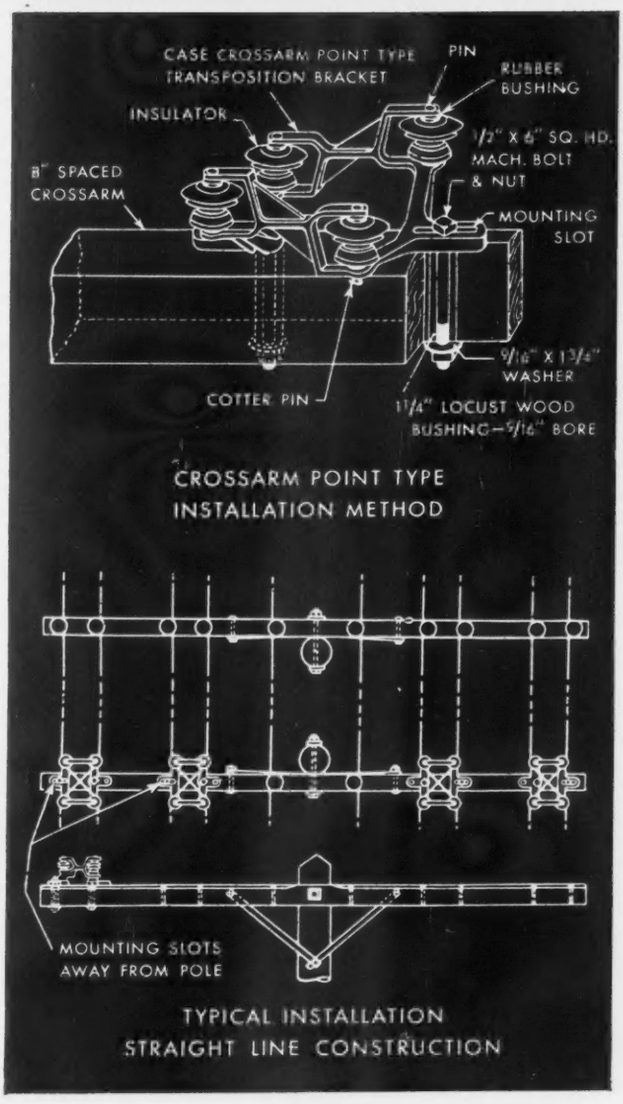
Please Turn To Page 66



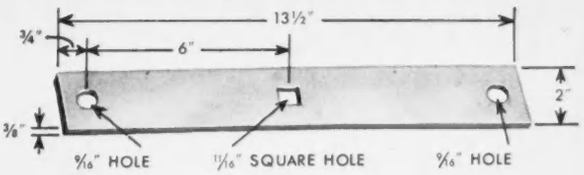
LINE CONSTRUCTION BLUEPRINTS

ITEMS SOME COMPANIES ARE USING TO MAKE LINE CONSTRUCTION WORK EASIER




CASE CROSSARM POINT TYPE TRANSPOSITION BRACKET
PIN
RUBBER BUSHING
INSULATOR
1/2" X 6" SQ. HD. MACH. BOLT & NUT
8" SPACED CROSSARM
MOUNTING SLOT
9/16" X 1 3/4" WASHER
COTTER PIN
1 1/4" LOCUST WOOD BUSHING—5/16" BORE
CROSSARM POINT TYPE INSTALLATION METHOD
MOUNTING SLOTS AWAY FROM POLE
TYPICAL INSTALLATION STRAIGHT LINE CONSTRUCTION

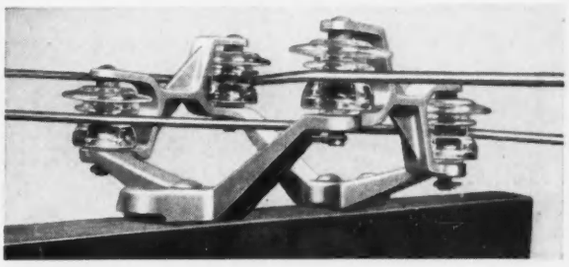
L-M TYPE "B" TANDEM TRANSPOSITION BRACKET



Used with transposition insulators for telephone line transpositions. Recommended for straight sections or at corners where pull is less than 15 feet. Heavy ⅜" x 2" steel, hot dip galvanized. REA-approved.

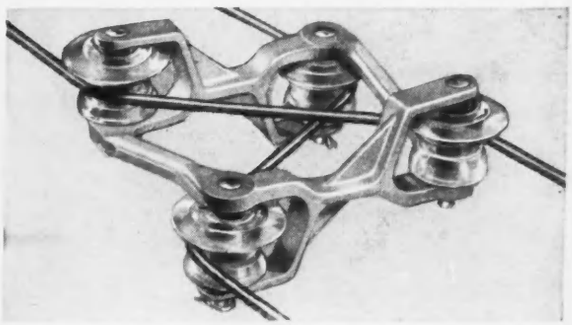
L-M CASE Roller Type TRANSPOSITION BRACKETS

Crossarm Point Type



Case Brackets equalize tension, balance lines, eliminate tie wires. Insulators *roll* easily as wire is tensioned—cutting installation time. Special rubber bushings set in insulators maintain continuity of service if insulators break. Available in crossarm and span point types, both of aluminum alloy. Weight—less than 4 pounds.

Span Point Type



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LINE MATERIAL *Line Construction Materials*

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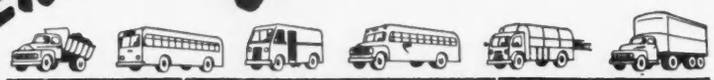
8 PLACES WHERE YOU CAN CUT COSTS ON YOUR FLEET



		PROBLEM	RESULT	CAUSE
1		Generators burn out.	DOWNTIME. Expensive repairs and replacements. Idle drivers.	Failure of regulator most common cause.
2		Sealed beam lamps fail too often.	Heavy replacement costs. Delays. Possible wrecks.	Excessive voltage.
3		Batteries go dead.	Excessive maintenance and replacement costs. Vehicles tied up.	Overcharging is frequent cause.
4		Wiring burns up.	Risk of fire. Vehicle tied up. Expensive repairs.	Regulator did not limit current.
5		Distributor points get pitted.	Poor engine performance. More maintenance costs.	Voltage too high.
6		Regulators fail.	DOWNTIME. Damage to other units. Expensive repairs and replacements.	Built to a price. Arcing at points.
7		Radio vibrators stick.	Mobile radios dead. Vehicles tied up. High maintenance.	Voltage too high.
8		Radio tubes have short life.	Excessive replacement costs. Dead radios. Increased maintenance.	Excessive voltage.

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Company _____
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connection for sealing if needed to provide more suction. The cotton ball will go through in jerks, pulling the trailing thread with it. When the cotton ball comes through at the other end, a heavier thread is tied to the thread which is then pulled through the conduit by hand. The cord should be heavy enough to pull the inside wire or cable after the thread comes through, without breaking the thread. Otherwise, another and heavier cord should be tied to the first cord and pulled through.

This method has saved hours of effort in bringing wire through conduit.

Star Drill Guard

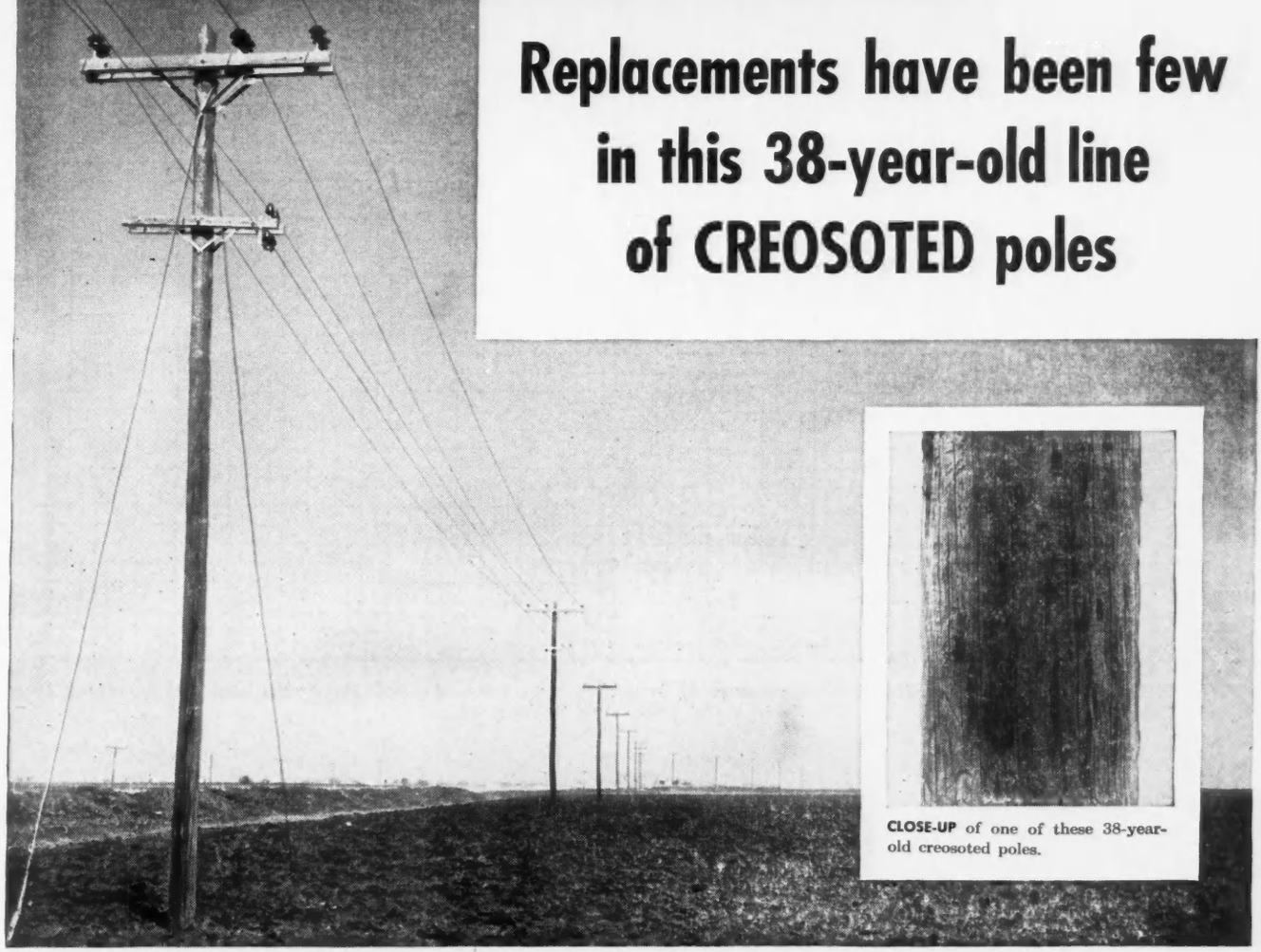
FIGURE THIRTEEN—This star drill guard prevents flying dust and chips.

THE STAR DRILL guard shown in *Figure* 13 was designed to eliminate flying dust and chips. It is made from a suction cup from a "Plumbers' Helper," with two cellulose sponges which are fastened to the bit with a spring collar and set screw. The springs are in sections and can be adjusted to fit the length of any bit. If needed, the sponges may be dampened with water to keep down dust.

"When one party dominates any unit of government and that party is controlled by self-perpetuating bosses . . . good government is pretty sure to go out the window. There is nothing like lively competition to keep public officials on their toes." — (Addison (N.Y.) Advertiser)

Here's Proof of Performance...

Replacements have been few in this 38-year-old line of CREOSOTED poles



CLOSE-UP of one of these 38-year-old creosoted poles.

IN THE MERTENS-TO-MALONE LINE of Texas Power and Light Company, 94% of the Creosoted poles installed in 1916 are still in service.

TEXAS Power and Light Company has had excellent performance from poles treated with Creosote on many locations in its far-flung system. For example, the long life in the section between Mertens and Malone is outstanding.

In 1916, 196 Southern Yellow Pine poles, treated with Creosote, replaced untreated poles that had given less than 15 years' service. To date, only about six per cent of these poles have been replaced, and most of the replaced poles were casualties from reasons other than decay.

Texas Power and Light Company feels that there are at least 10 years of life left in the remaining poles, and when they are replaced, poles treated with Creosote will be used again.

Creosote's combination of toxicity and permanence is the reason why it has established so many service records like this. And service records, after all, are your best assurance of future performance from a wood preservative.

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USS CREOSOTE

UNITED STATES STEEL

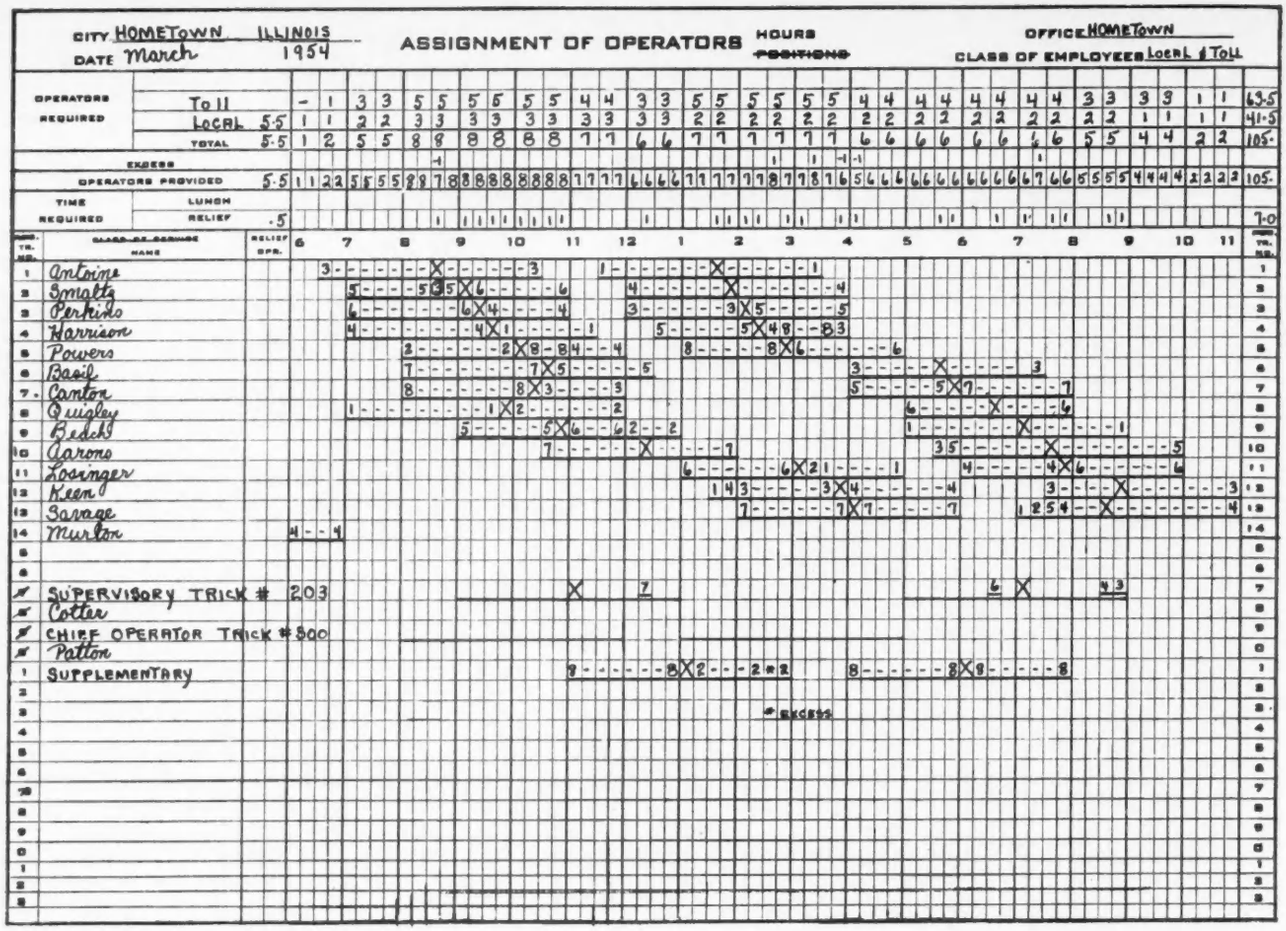

FIGURE ONE represents a schedule with the names of employes who have selected the tricks and the positions to which the tricks are assigned.

Force Assignment

BY RUTH E. RICHARDS
Methods Supervisor,
General Telephone Co. of Ill.
Springfield, Ill.

A sound force program includes anticipating traffic, anticipating force changes such as losses, additions and vacations, and planning for training.

THE WORDS force assignment in their simplest literal meaning imply the assigning of hours of work to the traffic force. They do mean that, but more also, for the assignment of hours is just one small part of the overall scheme of operating room management methods termed "force adjustment." These methods are designed to provide the proper number of people at the proper time for a given volume of traffic or business offered.

Telephone companies large enough to maintain a separate traffic department staff, generally concentrate the more technical phases of Force Adjustment work in a centralized traffic office. In smaller companies or exchanges the work is less complex and is generally a combined responsibility of the chief operator and management. But whether a company's operations be great or small there must be a proper balance between the service rendered and the cost of providing the service.

A sound force program includes anticipating traffic, anticipating force changes such as losses and additions and vacations, and planning for training. Many a small office chief operator practices force adjustment without realizing that she is doing so; the work she does is just part of being a chief operator.

The purpose of force assignment is to schedule the force provided so that an even grade of service may be

given each day and during all periods of the day.

Seniority Choice Of Tricks

THE METHODS of force assignment practiced vary with different companies. Some companies practice what is commonly termed "seniority choice of tricks." With this method the selection of hours of work, i.e. tour or trick, is based on the employes' length of service, with the selection made anew with each new schedule. There is generally some objection to the late hour tricks and many companies partially overcome this objection by the payment of a differential for such tricks. When operators with the longest period of service have the first choice of tricks, newer people on the force recognize that as time goes on they will get better tricks as force losses create vacancies. Under this method it is necessary that operators of average or better than average experience be assigned to relief schedules to prevent replacement of an experienced operator with one of less ability.

Some companies prefer the policy of rotation of hours (tricks or tours) among all operators. By this plan each operator takes "her turn" at working all of the tours on the schedule, thus each shares the disadvantages of less desirable hours as well as the advantages of the more desirable ones. This is the method of assignment adhered to by the company for which I work. Again, payment of a differential for late hours may compensate to a degree for the inconvenience.

With this method of assignment, all of the force share "relief" or "days off" assignment and the experience of the force is kept distributed throughout the day without difficulty.

A variation on the two methods described provides a combination method of assignment whereby a given proportion of the tricks to be assigned are assigned on a length-of-service choice and the balance of the tricks rotated.

Figure 1 represents a schedule with the names of the employes who have selected the tricks and the positions to which the tricks are assigned. It also indicates tricks which are assigned partly to 15 minute positional relief work. We find that a seating plan for each trick is equally effective where rotation of hours is practiced, since the overall balance of experience resulting from rotation tends to create a flexible force able to operate at all positions.

In an office where the "choice of trick" policy is in effect, days off assignments may be made in the same manner as outlined for forces on a rotation basis, since one of the vital aims of "day off" assignment is to distribute equitably throughout the force desirable days and combinations of days off duty.

Weekly Rotation

THE PERIOD for which tricks may be assigned will be a matter for each company's management to decide. We use a system of weekly rotation, though assignment for a two or four week period does not prolong the late hour assignments greatly, since the days off relieve the monotony.

The order of rotation is determined by arranging the morning-afternoon, morning-evening, and afternoon-evening tricks in such sequence as to distribute the day, split and late tricks at spaced intervals.

A typical schedule for a small toll center office may consist of four M-A tricks, three M-E tricks, three A-E tricks and one night trick, plus a supervisory trick and chief operator. (In general, night tricks are assigned on a permanent basis and are not included in the regular weekly rotation schedule.) The order of rotation might be:

*1. M-A
2. A-E
3. M-E
4. M-A
5. A-E
6. M-E
7. M-A
8. A-E
9. M-E
10. M-A
11. Sunday and day off relief for approximately 4 weeks
12. Repeat from *

In offices where the operating force is not flexible, that is, not all operators trained for toll work, the tricks assigned to local and toll forces should be rotated separately. The same procedure may be followed in preparing Sunday and Holiday schedules for posting.

Please Turn To Page 70

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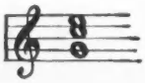

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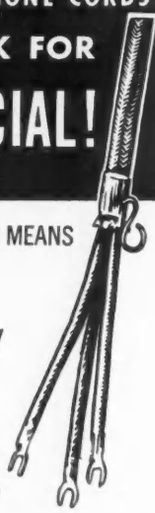

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Assignments to work on such days, as well as assignments of desirable days and combinations of days off, should be distributed fairly throughout the force.

We use the same method of rotation for Sunday and Holiday tricks, and assign our people to Sunday and Holiday work on a completely equitable basis. By this means it is planned that no operator will be assigned a second Sunday in the month until all have been assigned one Sunday. Some modification is occasionally necessary due to the requirements of particular Holidays and the maintenance of an even distribution of experience and ability.

Assignment of Days Off

THE FIRST item, in assigning days off, is to determine the number of days off to be given during the entire week, plus replacements for operators on vacation, leave of absence, etc. Where operators are assigned on a 40 hour week basis, plan one day off for each weekday trick assigned, plus one day off for each Sunday trick. For example:

13 weekday tricks = 13 days off
8 Sunday tricks = 8 days off
Total 21 days off to be given

If each Sunday relief (replacement) operator is assigned 5 tricks for the week, 4 replacement operators will be required. The extra trick will be vacated on the lightest traffic day, or assigned to a part time replacement operator.

The assignment and fair distribution of desirable days and combinations of days off cannot be over stressed since it is an important factor in maintaining the quality of service.

It has long been recognized that groups of people living and/or working together will tolerate incon-

FIGURE 2

WEEKLY ASSIGNMENT OF FORCE

OFFICE Hometown, U S A

WEEK BEGINNING April 12, 1954

NAME	REGULAR TRICK NUMBER	TRICK NUMBER SUN	MON	TUE	WED	THUR	FRI	SAT	TOTAL TRICKS OR HOURS
1. Bailey	1	57	1	S	S	1	1	1	40
2. Sanford	10	55	10	S	S	10	10	10	40
3. Hildreth	5	S	5	5	5	S	5	5	40
4. Payne	4	S	S	4	4	4	4	4	40
5. Myers	8	53	8	8	8	8	S	S *	40
6. Perry	7	S	S	7	7	7	7	7	40
7. Butler	2	52	2	2	2	2	S	S	40
8. Van Dohler	9	S	9	9	9	S	9	9	40
9. Courtley	6	51	6	S	S	6	6	6	40
10. Panola	3	S	3	3	3	S	3	3	40
11. Yarrow	11	S	(V)	(V)	(V)	(V)	(V)	S	40
12. Grant	12	54	12	12	12	12	S	S	40
13. McIntire	N. 13	58	13	S	S	13	13	13	40
							* Trick 8 vacated low traffic day		
Sunday Relief									
1. Rowe		S	S	1	1	3	12	12	40
2. Jacob		S	7	13	13	S	2	2	40
3. Swain		56	S	6	6	9	8	S	40
4. Turley		S	4	10	10	5	S	11	40
Vacation Replacement-Adams	PT Opr	S	11	11	11	11	11	S	40
Supervisory Tours									
Pastor	203	203	203	203	203	S	S	203	40
Gaston		S	Supl. # 1	A	S	203	203	300	32
Raymond, Chief Operator	300	S	300	300	300	300	300	S	40
TOTAL TRICKS OR HOURS		72	128	120	120	120	120	112	

S-indicates day off duty V-indicates vacation #-Pre arranged absence

FIGURE TWO may be used to list the names of the operators and the tricks assigned each week.

venience or endure hardships without complaint *if all of the group share equally* in the conditions to which they are subject. We must never lose sight of the fact that we are dealing primarily with *people*, not tricks, or hours, or days off.

A plan whereby each operator assigned to regular tricks is given all the days of the week as "day off," in succession is executed as follows:

(a) The first week when Sunday is not worked give Monday as day off.

(b) The second week when Sunday is worked give Tuesday and Wednesday as days off.

(c) The third week when Sunday is not worked give Thursday as day off.

(d) The fourth week when Sunday is worked give Friday and Saturday as days off.

(This assignment will be followed by Sunday and Monday off to provide a four day weekend.)

It is not contemplated that operators working the Sunday Relief tricks, or part time operators, will be included in this plan.

Weeks in which a holiday occurs, or special events, such as fair week, will disturb the pattern of the plan. Such weeks should be considered as separate units and the pattern resumed the following week.

A form such as shown in *Figure* 2 may be used to list the names of the operators and the tricks assigned for each week, Sunday through Saturday. Names may be entered in the order of rotation to be followed. Thus the operator whose name appears on line 1, the first week of the month, will appear on line 2 the second week, etc.

Following this pattern of assignment, each operator works all of the tricks on the schedule, then as many weeks of Sunday relief (replacement for days off) assignment as are required to fulfill the rotation schedule.

In assigning Sunday relief operators to tricks vacated by "days off," care should be exercised in distributing M-A, M-E, and A-E tricks among all Sunday Relief operators. Avoid assigning an early morning trick immediately following a late evening trick.

The supervisory force and chief operator may be listed at the lower portion of the form.

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RCR-2013A RCR-2016A	11/12 11/12	12.0 24.0	115 or 230 volts, 50 or 60 cycles, 1-phase	Electronic
RCR-1068B RCR-1069D RCR-1070D	22/24 22/24 22/24	1.0 3.0 6.0	115 volts, 60 cycle, 1-phase	Magnetic
RCR-2016B	22/24	12.0	115 or 230 volts, 50 or 60 cycles 1-phase	Electronic
RCR-3525 RCR-3550 RCR-35100	22/24 22/24 22/24	25.0 50.0 100.0	208 or 220 volts, 50 or 60 cycles 3-phase	Magnetic Amplifier

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Your regular Supplier offers the complete line of Raytheon RECTICHARGERS for all Telephone requirements. Ask him for complete information, or write us direct.

may be entered below the rotation schedule.

We find it desirable to use new employes, who are placed on the force following training, on the Sunday relief schedule for a period equal to the longest assignment on Sunday relief work.

To protect service objectives new employes should be assigned for the first four weeks to hours also covered by experienced employes.

Vacancies in trick assignments on the rotation schedule, created by losses, may be filled from the Sunday relief force. In order to preserve the order of rotation it is desirable to cover vacations by assignment from the relief force.

Procedure

(1) Schedule work is most easily accomplished if the following order of assignment is followed:

(a) Losses and additions noted.

(b) Assign operators to Sunday schedule.

(c) Vacations, planned absentees and disabilities indicated.

(d) Supplementary tours marked to indicate the days to be assigned.

(e) Requested days off, if granted, entered usually in colored pencil for record purposes.

(f) Days off for supervising operators and clerical forces, and their replacements assigned. Instructors and students assigned.

(g) Remaining days off assigned to rotation schedule.

(h) Assign tours to rotation schedule.

(i) Assign Sunday relief operators to tours and days off.

Force Assignment Related to Traffic Loads

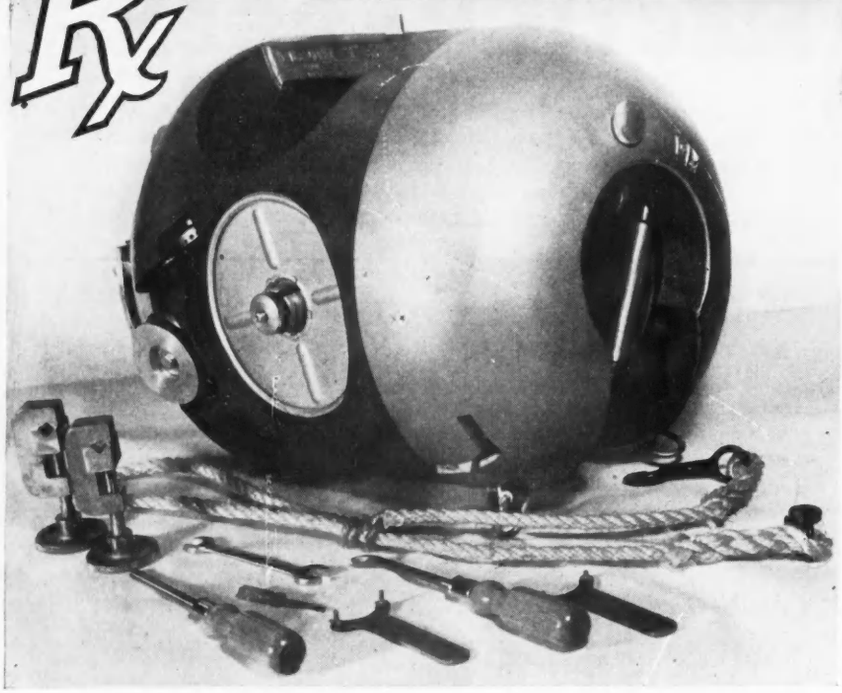
WHEN PREPARING the weekly assignment of force for an office (for an office not on a rotation schedule, this will be the days off and planned variations to the schedule) the number of scheduled days off on weekdays is varied for the different days so as to provide a schedule of employes on duty each day which is consistent with the normal deviation of daily traffic from the average. Daily variation may be determined by personal observation and counts of traffic for each weekday.

We find that in general Tuesday's and Thursday's traffic volumes are lower than the average for the week, while Monday and Friday traffic is above average. Monday traffic in most communities is largely day hour traffic (business) while Friday traffic is often heavier during the evening (social — especially youth). Since there is a growing tendency for business houses and offices to close on Saturday, many exchanges have less traffic on Saturday afternoons and evenings. Scheduling should be adjusted to meet this drop. We have found in some exchanges that up to 20 hours fewer are required on Saturday than on Monday.

By estimating the number of calls to be handled each day during the coming week, the chief operator can determine the number of hours and employes required to handle the traffic. She will multiply the number of calls by the coefficients to get units and divide by the objective overall load to get hours required.

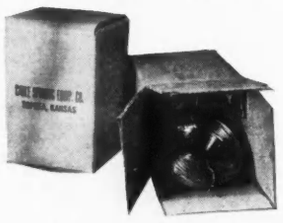
If she finds that her traffic trends are similar to those described in previous paragraphs, she may estimate

Rx for Double-Purpose Jobs



Here's the Neale Model K Pull Type Spinner—engineered for versatility. It's doing a great job on electric power lines . . . and telephone lines, too! Model K has a maximum capacity of three 2" O.D. cables, and will spin single cable as small as 5/8" O.D. This spinner may be used with either one or two coils of spinning wire, so you may have either a 13" spiral or wire 6½" apart. Model K is furnished with two LC5 Lashing Wire Clamps, tow rope, cable placing dolly, and chest.

Use Neale Wire For Best Results



Contact your jobber

CABLE SPINNING Equipment Company PHONE 2-7234

3100 TOPEKA AVE. TOPEKA, KANSAS

her requirements to be something like the following:

	Tricks Required	Days Off Assigned
Monday	17	4
Tuesday	15	5
Wednesday	16	4
Thursday	15	4 plus 1 trick vacated
Friday	17	4
Saturday	14	4 plus 1 A-E trick vacated
	—	—
	Total 94 tours	25 days off plus 2 tricks vacated
Sunday	11 tours	

Total employe days required for week—105
At 5 days per week per employe, 21 employes are required.

The average number of tricks per day is 16. Plan 1 day off for each weekday trick plus 1 day off for each Sunday trick assigned, or a total of 27 days off to be given. At 5 tricks per relief operator, 5 relief operators will be required (plus vacated tricks and/or part-time assignments) 27 days off equally spread would give 4.5 each day Monday through Saturday. Since days off are assigned as whole days, a typical distribution of 27 days off during the week might be as indicated above.

In an earlier paragraph we briefly mentioned seating plans for force assignment. You may be interested to know that we use them effectively in all exchanges where five positions or more are occupied busy-hour. If you would like to know more about them and the advantages they provide, will you indicate your interest by sending your request to TELEPHONE ENGINEER AND MANAGEMENT?—THE END.

Uses of Power Tools

(Continued From Page 44)

portant preventive measure is proper lubrication of the tool parts at required intervals where specified by the manufacturer. This prevents premature wear of moving or rotating parts. Next in importance is regular cleaning of the tool elements. Dust, dirt, wood chips, and other materials will clog motors, bearings, and chain drives. It is a good idea to have someone who is handy with machinery take the tool apart, clean out the foreign matter and relubricate the parts requiring it with the proper grades of grease or oil specified for the tool. Any excessive sparking of the commutator on tool motors that persists after ordinary cleaning requires checking of the brushes, cleaning between commutator segments, and possibly testing of the armature winding to locate shorted or open coils.

Portable gasoline driven generators need rather detailed care like any internal combustion engine set. A definite schedule of inspection and service is very desirable. The following service schedule is condensed from information furnished through the courtesy of D. W. Onan and Sons, Inc. The service periods indicated are for normal operation. For extreme conditions of load, temperatures, frequent starts, dust and dirt, more frequent servicing is needed.

Daily Service: For more than 8 hours daily operation, perform the following services at the end of each 8 hours of operation.

(1) Check the fuel supply often enough to assure a continuous supply of fuel, using clean, fresh regular gasoline of 68 to 74 octane, not premium grade gasoline. Do not fill the fuel tank while the engine is running.

(2) Check the crankcase oil level, and, if necessary, add the proper grade of oil to bring it up to the high level. Do not overfill. Do not allow the plant to operate with the oil level below the low mark. Replace the oil fill cap securely to avoid air and oil leakage which might cause loss of power or excessive oil consumption. If there is light blue, smoky exhaust coming from the exhaust outlet of the plant, check the oil fill cap for air leaks before making any additional checks.

(3) In the air cleaner, check the oil level in the cup and add proper oil to the level indicated, if necessary.

(4) Keep the gasoline engine and generator clean and free of dust and dirt. Clean off excess oil or grease.

Weekly Service: For more than 50 hours operation weekly, service as indicated at the end of each 50 hours of operation.

(1) Check the oil level, and, if necessary, add proper oil to bring

Insto-Gas
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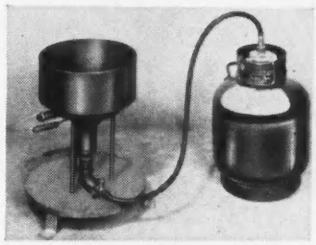
JUMBO FURNACE



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When a 50 ft. connecting hose is used the JUMBO furnace can give service over a wide area without moving the cylinder. The flame control valve is located on the furnace.

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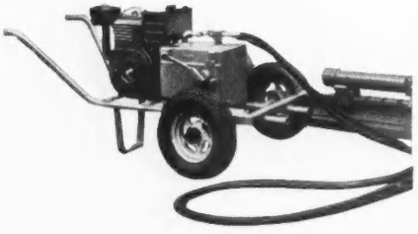

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the oil to the high level. Change oil every 100 operating hours unless it has been necessary to use highly leaded fuel or diluted oil, then change every 50 operating hours. Replace the oil fill cap securely to avoid air and oil leakage. Check the crankcase breather valve to see that it is functioning.

(2) Thoroughly clean the spark plugs and reset the gap between electrodes to 0.025 inch.

(3) Clean the screen and cup of the air cleaner thoroughly in suitable solvent. Allow to dry. Refill the cup to the indicated level with oil of the same SAE number as used in the engine crankcase.

(4) Lubricate the governor arm to throttle arm linkage.

Monthly Service: For more than 200 hours operation monthly, service as indicated at the end of each 200 hours of operation.

(1) Remove and clean fuel sediment bowl and screen. Be sure the gasket is in good order before replacing. Reassemble the filter and inspect for leaks, correcting any found.

(2) Inspect all exhaust connections. Tighten or replace parts as required.

(3) Remove carbon deposits from the engine every 250 operating hours.

(4) Check the condition of the ignition breaker points. If the points are badly pitted or burned, replace them. If they are not too bad they may be resurfaced, using a fine stone. Afterwards, adjust the breaker point gap to 0.020 inch at full separation, making the points meet squarely and evenly. Place a drop of oil on the breaker arm pivot shaft whenever new points are installed. (If excessive arcing occurs at the breaker points or the spark at the spark plug is yellow in color, the condenser is defective and should be replaced by one of proper capacity.)

Safety Precautions in Handling Power Driven Tools

POWER DRIVEN tools require reasonable caution in handling, particularly those with cutting blades like saws and drills. These tools should be watched while starting and during operation and should not be set down or laid aside while still running.

Electric power tools are provided with a third conductor to ground the tool and prevent shock to the operator should the housing become energized through some defect in the wiring. While the point of using a grounding conductor on a tool operated by a portable generator set is debatable, this precaution is desirable.

Line Measurements

(Continued From Page 54)

signal voltage with negligible error. If the total voltage across the load resistance is less than 15 db above the noise voltage, the correct value of received signal voltage can be detemined from the equation:

$$Vs = \sqrt{Vt^2 - Vn^2}$$

Where Vs is the received signal voltage, Vt is the total received voltage, and Vn is the received noise voltage. A graph, based on this equation, is shown in *Figure* 5.

Test Results

WHEN THE transmission loss measurements have been completed, the results should be plotted in graph form for evaluation.

Evaluation of the results should take into consideration the weather conditions prevailing along the line at the time of test. If possible the test should be conducted under wet weather conditions and allowances made for the worst weather conditions likely to be encountered.

Comparison of the test results with the regulation and gain specifications of the manufacturers' equipment will be useful in evaluating how carrier can best be applied. Repeater spacing, for example, is determined from maximum attenuation under the worst weather conditions. The results will show (at least from a transmission loss standpoint) if the line is suitable for all carrier frequencies to be employed or if only part of the carrier frequency spectrum can be used without additional line work. In the latter case it is usually possible to order a partially equipped carrier system with these channels having too great a loss being omitted from the system|—THE END.

In this issue Mr. Mitchell discusses: — (A) Definition of an obsolete symbol; (B) The Volume Unit Meter; (C) Comparative value of Phantom Circuits and their Side Circuits; (D) Several Normal Transmission Limits; and (E) The Compandor.

QUESTIONS and ANSWERS

Conducted by JAY G. MITCHELL

QUESTION: *What is the meaning of the symbol TU?*

ANSWER: TU is an abbreviation of the term Transmission Unit. Formerly this unit was used in ways similar to those in which the Db. is now used. The importance of exact quantitative determinations in telephone transmission, however, coupled with the increasing popularity of definite significances for the decibel method make it very advisable to read the modern literature in studying these matters. The Transmission Unit rendered a great service but the more modern terminology is thought to be an improvement in every way.

QUESTION: *We are beginning to understand the methods of applying the Decibel Calibration of the multi-tester in matters related to telephonic communication with great benefit. Merely as a mater of curiousity will you please comment briefly on the relation, if any, between the Decibel Meter and the Volume Unit Meter.*

ANSWER: This inquiry enters a field that is entirely outside of the scope of the conventional multi-tester. However it is closely affiliated with the metering of sound transmission by measurement of its power as expressed in an electrical equivalent. Measurements of this sort are required in testing the effectiveness of Public Address Systems, the comparative volumes of the applause accorded to individual entertainers, the quality realized in the broadcasting of musical selections and other somewhat similar determinations of effectiveness such as the acoustic characteristics of public assembly halls.

Unlike the Decibel Calibration the Volume Meter, known as the VU Meter, usually is so calibrated that its zero scale indication is fixed at the point where the pointer rests when responding to an indicated power level supposed to represent, electrically, the threshold of normal hearing. The internal instrument impedance of the VU Meter must be high in order to eliminate the possibility of a diversion of a portion of the electrical power of the circuit under observation sufficient to perceptibly affect the instrument readings.

With these qualifications the VU Meter should indicate 0 when connected to a circuit carrying alternating current in a 600 ohm loop having a power of 0.001 watt, a voltage of 1.23 and a frequency of 1,000 cycles per second. When in use the VU Meter should be supplied through a constant impedance attenuator producing an attentuation of 4 Db. and under these conditions its pointer should rest at 0 thereby indicating the volume of the transmission *in excess of* 4 *Db.* It is to be noted that in some applications this point on the scale is marked 100% also.

Because the VU Meter is used to evaluate the volume of continued or repeated sound its indicating movement is somewhat ballistic. This means that the movement will be more satisfactorily retained in a comparatively steady position when responding to continued or repeated

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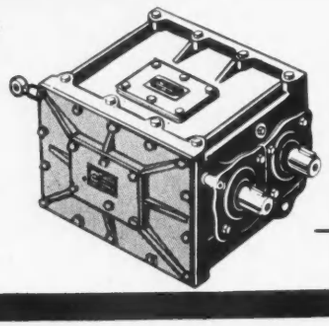

Similar kits available for Dodge Power Wagon, Chevrolet, International, etc.

Tel-E-Lect PRODUCTS, INC.
10013 Minnetonka Boulevard
Minneapolis 16, Minnesota

sound impulses, such as continued applause. It is also customary to read the indications of the VU Meter by noting three peak indications over a period of ten seconds and assuming that the arithmetical average of these three indications is the meter reading. Under the conditions outlined the 0 reading of the VU Meter represents an alternating voltage of about 1.23—and this will be seen, by consulting the graphs of Db. vs. volts in a loop of 600 ohms impedance and a *zero reference level of* 0.001 *watt*, reproduced below, to correspond with a loss of 4 Db.

This inquiry is very timely it would seem and it has been answered in such a way as to make the theory of Volume Meter more understandable. It is proper, however, to include a warning. Different makes of so-called Volume Meters may have different reference levels from the figure given above, different impedance and, in such instances, may require a very careful revision of any observations made in order to bring them into a comparative relation with the usual type of meter.

QUESTION: *In a discussion of transmission matters an effort was made to compare the losses in phantom circuits with those in the physical side circuits. Can you state an approximate applicable rule that may be considered in making our preliminary toll plant layouts.*

ANSWER: Of course there are many variables to be considered in this kind of a problem. Exact design must be the guiding basis but there *is* a rough rule of thumb that has not been proven greatly undependable.

This rough rule, which must, of course, be checked carefully with all local conditions is that the attenuation in a phantom circuit is approximately 0.8 of that in each of its identical physical side circuits.

QUESTION: *We have decided to eliminate all the causes of poor transmission possible in our telephone plant. Can you list some reasonable transmission losses that may be used in the preliminary consideration of the portions of our plant to receive attention in the overall elimination of unduly high transmission losses.*

ANSWER: This inquiry does not contain some data that should be at hand before an effort is made to

reply. However it happens that QUESTIONS AND ANSWERS has some data as to the type of plant operated by this writer and on that basis the following general data is submitted for preliminary application. Such an application should be followed, of course, by the most careful study of all known factors in specific cases of substandard transmission.

General Transmission Limits

Standard Network	30 Db.
Terminating Loop	6 Db.
Terminating Loop Link	18 Db.
Via Common Loop (trunk)	6 Db.
In common Battery Central City Office (Sum of Transmitting and Receiving), Approx.	3 Db.
In Common Battery (Outlying Residential Offices (Sum of Transmitting and Receiving), Approx.	6 Db.
Supervisory Limits about	650 Ohms
Insulation minimum	10,000 Ohms

As stated these figures are approximate and must be checked for any given circuit condition before any plant changes are made.

QUESTION: *What is the underlying principle of the equipment recommended for noisy toll circuits and known as "The Compandor"?*

ANSWER: The basic principle of equipment of this kind is a compressor and expander. The name is based upon these two terms. The noise (hash) on the noisy circuit is attenuated and then the frequencies of the *desired* current or currents are amplified and filtered so that much of the interference is eliminated.

The results of properly engineered applications of this device are little short of marvelous. If you have any toll circuits that are not paying their way because of foreign interference it is suggested that you direct an inquiry to the manufacturers of this equipment and outline all the known facts for consideration.

P. M. Ferguson, Sr., Elected President Mankato Citizens Telephone Co.

P. M. FERGUSON, who started in the telephone business as an office boy, last month was elected president of the Mankato (Minn.) Citizens Telephone Co., succeeding S. B. Wilson, who died Jan. 24.

The election came at a special meeting of the company's board of directors. William C. Blethen succeeded Mr. Ferguson as vice president of the company, a position the latter had held since 1944. Mr. Ferguson will continue as general manager.

No action was taken to name a director to succeed Mr. Wilson. Present members of the board, in addition to Ferguson and Blethen, are R. S. Patterson, secretary-treasurer; John G. Gerlich, E. W. Owen, Jerome F. Thomas, R. L. Myers, Frank Sheehan, John R. Snow, George Pass and Lee Snilsberg.

The election of Mr. Ferguson to the presidency climaxed a telephone

PETER MILLAR (left), Commissioner of Telephones, Winnipeg, Canada, and P. M. FERGUSON, SR., Mankato, Minn.

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business a chance for a friendly chat with our customers. In the
relaxed atmosphere of the living room, we tell what we are doing
to insure still better service each year. Thus, The Telephone Hour
strengthens good will between those who supply and those
who use the world's finest telephone service.

career that began with the Northwestern Bell Telephone Exchange Company in St. Paul in 1900. He held various jobs with the Bell Company, office boy, installer and finally, switchboard man. In 1907 he went to Mankato to become wire chief of the Citizens company. He was made manager in 1909 and 10 years ago, vice president. His more than half a century of service has brought "Pete" state and national attention in telephone company circles.

Under Mr. Ferguson's leadership the Mankato company has grown steadily. In 1918, after purchasing the competing Bell exchange, the company had two exchanges and served approximately 3670 telephones. On January 1, 1953, it operated 12,065 telephones and seven exchanges. Capital invested in the company in 1918 was $260,899.23. On January 1, 1953 it was $1,841,627. In his forty-six years with the Mankato company, Mr. Ferguson has played a leading part in bringing about this tremendous growth.

Outside his own company, Mr. Ferguson has been prominent also in the activities of the Independent telephone industry. He has at various times been treasurer, president and a director of the Minnesota Telephone Association, and a director and member of the executive committee of the United States Independent Telephone Association.

In his home community he has been active in many organizations devoted to civic betterment; he is at present a member of the Mankato City Planning Committee. He assisted in the organization of the local Kiwanis Club, served as president during its first two years, and is now in charge of its summer camp for under-privileged children. He is a Presbyterian and has been a Trustee of the local church. He is Past Exalted Ruler of the local lodge of Elks, a Scottish Rite Mason and a member of Ozman Shrine at St. Paul.

Mr. Ferguson was married in October, 1907, to Lydia Ludvig of St. Paul, who died in 1915 after a long illness leaving him with his son, P. M. Ferguson, Jr., then twenty months old. In 1918 he married Mary Bartosh of Owatonna, Minnesota, who is still living happily with him in Mankato.

His son, who joined the Company after extensive service in World War II as a captain in the Signal Corps, is now engineer and assistant manager of the company.

AT&T Annual Report For 1953 Shows Earnings Up To 6.1% On Total Capital

THE TREMENDOUS importance of the Bell System to the nation's economic and social life — of particular significance in strengthening the economy against a downturn — is depicted on virtually every page of the annual report of American Telephone & Telegraph Co., President Cleo F. Craig, made public Feb. 23.

"Americans in 1953 found their telephone service fast, convenient, economical and progressively improving," Mr. Craig declared. "They used more of it than in any year since telephoning first began."

While the total number of telephones operated by the Bell System rose to 41,350,000 by the end of last year, with the number of held orders reduced by a third and more than 1,000,000 requests for upgrading filled, the Bell System companies spent more than $25,000,000 a week, or about $1,400,000,000 for the year, on improvement and expansion of telephone facilities.

While new demand receded "somewhat" in the later months of the year, and the volume of long-distance calling did not show its usual rate of increase, Mr. Craig said "the flow of new orders coming in is still very large and we have a great deal of work to do to meet all the needs of telephone users . . . This is all urgent business and continuing heavy construction is essential to a first-rate job of meeting our customers' wants this despite the fact that our postwar expenditures for new construction have already reached a total of more than $9,000,000,000.

"Part of this amount, of course, has been spent to increase long-distance facilities. Forty million miles of voice-

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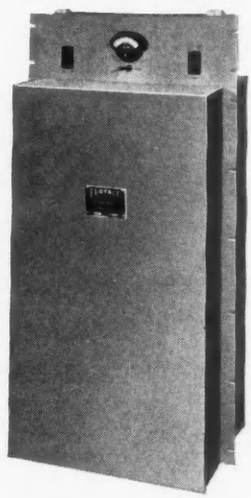

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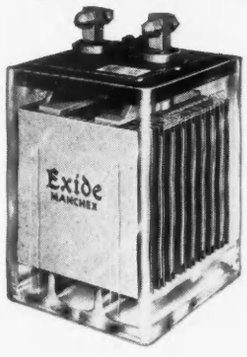
Exide-Manchex telephone batteries



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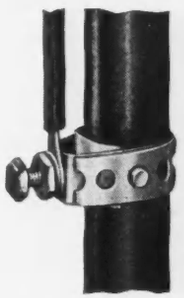

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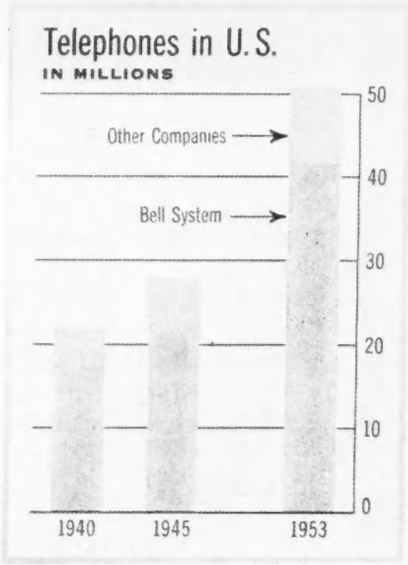
ways now crosscross the nation. The ways now criscross the nation. The the largest since the war, and has appreciably speeded the service. Average time for putting through out-of-town calls dropped from 1.8 minutes in 1952 to 1.6 minutes in 1953. Also, there were fewer delays on account of long-distance lines being busy; this meant that more calls than ever before — 95 per cent of them — went through while the person calling held the line.

"For the year as a whole, long-distance conversations increased about 5 per cent over 1952. The percentage increase was higher in the first half of the year, lower in the second half. At the end of 1953, the day-to-day volume was about the same as it had been 12 months before; this is also true today. We now have lines and switchboards available to justify vigorous promotion of long-distance service, and determined sales effort is under way."

On the financial side, earnings on Bell System capital were at the rate of 6.1 per cent compared with 5.9 per cent in the preceding year. Net income equaled $11.71 per share of AT&T stock, compared with $11.45 in 1952. Mr. Craig brought out that "The 1953 result was above the post war average of 5.6 per cent, but well below the average earnings of 6.6 per cent during the previous 25 years, which included years of depression as well as years of high business activity."

Including excise taxes of $670,000,000, direct taxes on Bell System service in 1953 totaled $1,469,000,000. This was an average of more than $3.00 per telephone a month, it was pointed out. Mr. Craig emphasized that this heavy burden discriminates against telephone users and added that they are paying higher than luxury excise taxes on a service that is not at all a luxury.

"Bell System progress took many forms in 1953," Mr. Craig declared. "Outstanding was steady improvement in service quality. Operators handled calls on the average with greater speed. Maintenance men kept the service even more dependable, more free from mechanical failure than at any time in the past. Installers and construction crews put in more and more telephones and lines and switching equipment of new design and greater capabilities."



Regulatory authorities in 29 states last year authorized rate increases averaging about 40 cents per month for 17,500,000 telephones, Mr. Craig reported. He also recalled the long-distance rate revisions, adding that "Despite the increase in 1953, most rates for interstate long-distance telephone service are still below prewar levels."

Investment Per Telephone Rises to More than $400

APPLICATIONS were pending for intrastate increases in 18 states at the end of the year, and "other requests are contemplated," the AT&T President brought out. Pointing to inflationary factors, he noted that "the average investment in local facilities serving an individual line residence telephone in 1940 was about $265. The average for each such telephone added in 1953 was more than $400."

More than 81 per cent of the System's telephones were dial at the end of the year, the report showed, adding that last year the number of cities and towns in the toll dialing network rose to 2450. Operators dialed 44 per cent of all long-distance calls straight through to the called telephones. This year, "the range of customer dialing will increase in several more metropolitan areas, including San Francisco, New York, and Philadelphia," Mr. Craig cited.

Depicting the "many sides to the country's need for good communications," Mr. Craig pointed out that last year telephones in rural areas increased nearly 275,000, bringing total postwar additions in those areas to 2,250,000; more than twice as many cities and television stations are interconnected by the Bell System TV network as a year ago; intercity color TV networking began Jan. 1, while in another TV service, events were brought to theater audiences seven times during the year over intercity facilities; more than 12,000 telephones in vehicles can now be connected with the nationwide system; and the Bell System undertook a study of improved air traffic control in cooperation with the Air Navigation Development Board and CAA.

During the year, prior to the $602,000,000 debenture issue, debenture conversions and other financing results brought the proportion of debt in the Bell System's total capital down to less than 38 per cent. "The new issue raised the debt ratio to about 41 per cent at year end; complete conversion of all convertibles now outstanding would reduce it to about one-third — approximately the same as when we entered the postwar period. It was largely because our debt at that time was a moderate part of our capital that we were able to raise at reasonable cost the great sums of new money needed to meet postwar demands for service."

Mr. Craig reported that the number of shareowners at the close of the year was 1,265,000, of which about 200,000 are Bell System employes. He added that some 47,000 trustees, corporations, and other organizations own AT&T stock, including institutions which hold the stock for the benefit of millions of people.

Of the 703,000 employes at the end of the year, nearly 107,000 has served in the System for 25 years or more. About 15,000 employes are on military leave, while nine out of ten who have completed their military service have returned to the companies.

W. E. Sales For Defense Highest Since War

WESTERN ELECTRIC, Mr. Craig pointed out, "had a very busy year." Total sales were $1,507,000,000, an increase of $196,000,000 over the preceding year, while earnings were $52,600,000, or 3.5 per cent of sales, the AT&T President reported.

Western Electric "sales of

$440,204,000 to the defense department of the government were by far the highest since World War II," the report added. "The company made substantial deliveries of the Nike guided missile system to the Army, which is proceeding with installations to protect important cities and military establishments. The company also had in production throughout the year other electronic weapon systems developed by Bell Laboratories, as well as military communication apparatus." Mr. Craig recalled the project for the distant early warning line radar stations along the northern shores of Alaska and Canada, and the operations of the Sandia Corp., Western Electric subsidiary which develops and designs atomic weapons.

During the year, the report noted, the people of the Bell System "enlarged and strengthened the communication networks on which military and civil defense agencies rely. For many customers who need extensive communications — pipelines, utilities, railroads, airlines, and others — they provided a variety of modern services which increase industrial operating efficiency and reduce costs."

Two of the most historic milestones in the history of the telephone industry were recorded in President Craig's report — the placing of the 50,000,000th telephone on the desk of President Eisenhower at the White House, and the completion of an agreement under which the first transatlantic telephone cable will be laid. — THE END.

Gary Stockholders OK Stock Split

PARTICIPATING common and common stockholders of Theodore Gary & Co., at a special meeting in Kansas City March 3, approved four ammendments to the articles of incorporation, including a five-for-one stock split and an increase in the number of shares. President F. S. Spring announced.

The increase in the authorized number of shares was to 1,700,000 of participating common and 2,500,000 shares of common. In approving the stock split, stockholders approved the change of 30 cents per share prior preference dividend on participating common to six cents per share and the common stock to a par value of 20 cents per share. Also approved was elimination of the company's authorized class A stock.

1953 Year Of Development For Peninsular Tel. Co.

LAST YEAR was "one of pronounced development in the area served" by the Peninsular Telephone Co., President Carl Brorein of the Florida Independent company declared in the annual report to stockholders. The net gain in telephones in service, in 1953, he cited as a prime example of Peninsular's continuing growth, amounted to 21,449, resulting from the increased budget for plant additions last year when $12,013,625 was spent on construction.

At the end of 1953, Mr. Brorein reported, the company had 210,370 telephones in service — all of them dial. Operating revenues for 1953 totaled $14,489,655, compared with $12,115,087 the previous year; operating expenses and taxes amounted to $12,118,198 last year against $10,298,259 in 1952; net income in 1953 was $1,951,736, against $1,453,740 in the privous 12 months.

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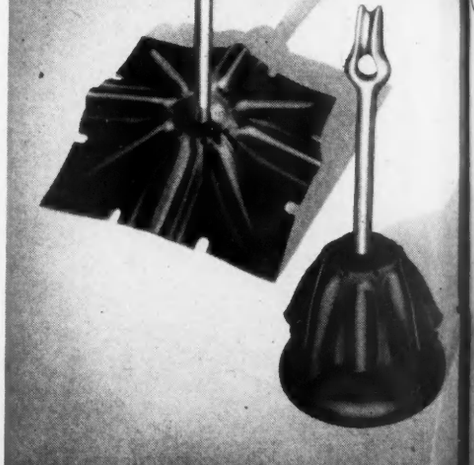

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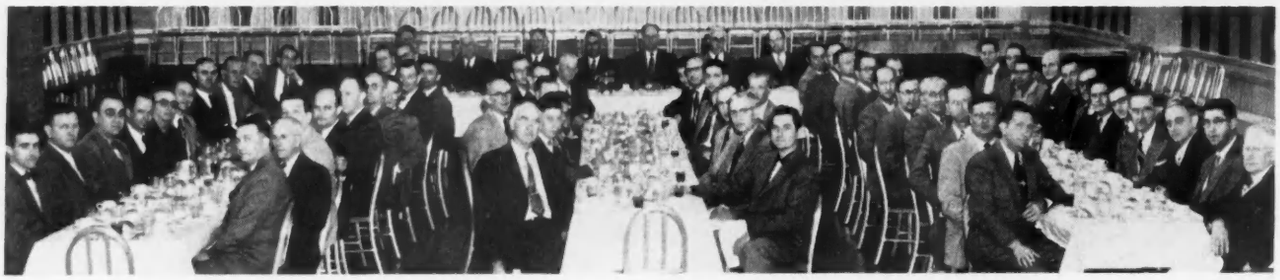

Members of the Small Company Committee of the Missouri Telephone Association met February 10 at the Governor Hotel, Jefferson City.

SMALL COMPANY PROGRAM AIDS MISSOURI COMPANIES

LAST MONTH the Missouri Telephone Association looked back at the accomplishments of its active, result-producing Small Company Assistance Program. Holding a "Small Company Committee Workshop" at the Hotel Governor, Jefferson City, 68 persons participated in a conference that proved the Missouri association has found and put into operation an assistance program that is aiding the states' Independent telephone companies.

Although the program has been in operation only 18 short months, J. L. Van Horn, chairman of the General Small Company Committee reported the following accomplishments for 1953: —

(1) The Association's District Committees had worked with 193 companies having 246 exchanges and 66,491 stations and given assistance which helped 36 companies establish approved accounting practices, compared 49 market surveys and commercial forecasts, and recommended 74 dial and common battery conversions which have been accepted with the result that 45 dial central office units are on order.

(2) Ninety exchange major outside plant improvements and expansion recommendations were accepted and many are underway.

(3) Twenty-three exchange rate increases were obtained. Some by the petition method and others through rate case hearings.

(4) Twenty-three companies received loan commitments in excess of $3,000,000.

(5) One-hundred exchange area boundary maps for small companies were filed with the Missouri Public Service Commission.

(6) Twenty-three companies acquired or consolidated exchanges with other companies.

(7) Through cooperation with Ralph Duffy, chief engineer of the Missouri Public Service Commission and the Commission's engineering staff, a plan for simplified procedure for making appraisals and inventories for small telephone companies was worked out. Henry Altepeter assisted materially in this accomplishment.

Mr. Van Horn's summarization of the Small Company Assistance Program's accomplishments recalled the fall of 1952 when some of the small Independent telephone companies in Missouri began to experience financial and service difficulties. This condition was brought about by inability to replace worn outside plant and central office equipment during the War, continuing Post-War inflation, and the enormous Post-War demand for more and better telephone service in both town and rural areas.

To improve this situation and to keep small telephone companies in business, the Missouri association initiated its Small Company Assistance Program by forming the General Small Company Committee, with Mr. Van Horn as chairman, to set up and implement an assistance program.

Missouri was divided into four districts with headquarters at Moberly, St. Joseph, Springfield and Webster Groves, Mo., and four District Small Company Committees were established to carry out the plans and policies of the program. Initially, each committee consisted of from five to seven Independent company members who were selected by the General Committee for their demonstrated abilities in managing small telephone companies. One of the Independent company members of each Committee was appointed chairman, and one Bell employe was appointed to each Committee on a full time basis to act as Secretary.

Initial Training Material

THE GENERAL Small Company Committee prepared initial training material entitled "Successful Operation of a Small Telephone Company." Each District Committee was then activated with a one-day training conference in the Fall of 1952. These training meetings were conducted by George A. Hearne, president of the Missouri Telephone Association, Mr. Van Horn, and D. Coombes who is secretary of the General Committee. Since that time, additional training of the Committee personnel has been provided by the General Committee and by the District Committees and telephone equipment manufacturers.

The first major district committee continuation training project was a two-day conference held in St. Louis in Feb. 1953 on the "Basic Principles and Procedures in Forecasting Tele-

phone Markets." This meeting was also attended by 23 officials of the leading Independent telephone companies in Missouri and Arkansas, including directors of the Missouri Telephone Association. This conference stressed that early market survey training is essential for (1) the proper engineering of outside plant and central office requirements, (2) for basic requirements for financing, and (3) for rate case purposes.

Since the original training project educational programs have been a part of almost every monthly District Committee meeting, the Association District Meetings and the State Convention and competent instruction on various phases of telephone operations have been featured at the meetings. Representatives of directory sales companies, accounting firms, telephone engineers from equipment companies and bankers have participated in the association's educational program.

In July 1953, the General Small Company Committee held a conference with the Missouri Public Service Commission and its Staff in Jefferson City, during which the members of the Commission and Commission Staff were informed of the objectives and operation of the Missouri Telephone Association Assistance Program and the activities of the four District Committees. The Commission endorsed the program, commended the Association for its constructive efforts to help small telephone companies and promised its full cooperation.

Association District Meetings

DURING September, 1953, District Meetings of the Missouri association were held in Cameron, Macon and Springfield, Mo. These meetings were attended by 400 people representing 84 companies and 140 exchanges. In addition, 10 representatives of suppliers, accountants and engineering firms were present. Experienced management personnel addressed the meetings on traffic, outside plant and engineering subjects and the programs emphasized assistance for small companies. Homer Thorp, chief accountant of the Missouri Public Service Commission, addressed two of the meetings on the subject of "Preparation of Annual Reports by Independent Telephone Companies."

In September, 1953, a "Small Company Committee Workshop" was held in Jefferson City. It was attended by 45 members of the four District Small Company Committees, the General Small Company Committee, officials of the Missouri Telephone Association and members of the Missouri Public Service Commission Staff. Mr. Thorp had requested the "Workshop" be held to discuss accounting problems of the Independent telephone industry. He requested the assistance of the District Small Company Committees in contacting certain companies to obtain more accurate Annual Reports and suggested a simplified bookkeeping system for the use of small telephone companies. At this meeting, Mr. Thorp announced the appointment of an additional accountant to his staff assigned to work through the District Committees on this project.

In December, 1953, the first of a series of preliminary meetings was held with Ralph Duffy, chief engineer of the Missouri Public Service

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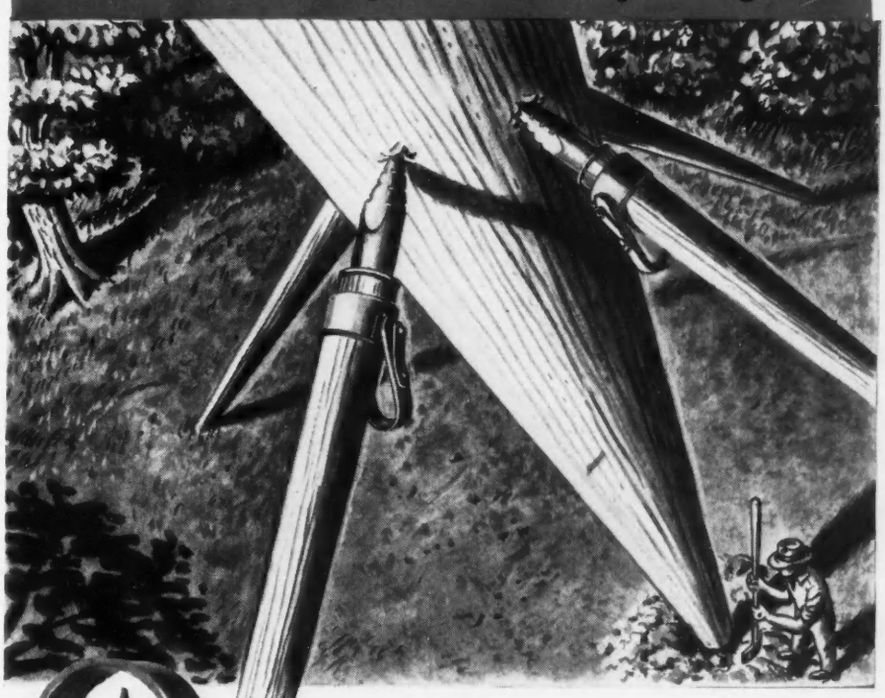

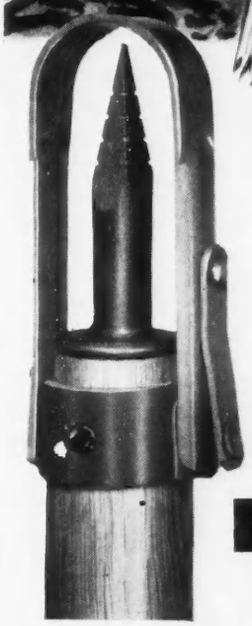

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Commission and representatives of the association's General Small Company Committee for the purpose of establishing simplified procedures for making appraisals and inventories of small telephone companies. This project is being carried out jointly by the Association District Committees and the Commission's Engineering Staff.

Also during 1953, four committee meetings of the USITA Regional Small Company Committee for the Southwestern Bell Telephone Co. Area were held to review the progress of the Assistance Program and recommend additional aids to the program. J. M. Roberts of Gallatin, Frank M. Browne of Clarence and James Carter of Salisbury, are the Missouri association members of the USITA Regional Small Company Committee.

Future Objectives of The Small Company Program

WITH A BUSY and successful year in 1953, leaders of the Missouri assistance program are hard at work on the following assistance items:

(1) *Company Records* including adequate accounting records; market surveys and forecasts; exchange area boundaries; preparation and filing of General Exchange Tariff; and appraisal and inventory.

(2) *Organization and Financing* including incorporation of a company, and securing new money.

(3) *Rates and Revenue*, covering Exchange rate increases; directory advertising revenue; and pay station development.

(4) *Operating Improvements*, traffic and plant.

(5) *Public relations*, including advertising; news stories; community activities; open houses; and employe activities.

Other assistance items which may require from one to three years to accomplish or are industry-wide projects in which Independent Telephone Companies may or should participate are: —

(1) Acquisition of telephone properties and consolidation of two or more companies into a sound and larger company.

(2) Dial and common battery conversions.

(3) Exchange outside plant rebuilding.

(4) Program for plant construction of rural area.

(5) Participation of Independent companies in operator toll dialing and customer toll dialing.

(6) Programs to increase exchange rate levels in the industry and a recommendation that the association appoint a Rate Committee to establish a rate policy and assist Independent companies in preparing and presenting rate cases to the commission.

(7) Programs stressing the importance of cooperation between Independent telephone companies and Bell companies in furnishing communication services and facilities for Right-of-Way Companies, such as, railroads, oil and pipe line companies, power companies, and urging cooperation between Independent telephone companies and Bell companies in furnishing television services and facilities in Independent company territory.

(8) Completion of arrangements to provide means for long term financing to carry out improvement programs. Included in this project are plans to contact banks and insurance companies and the development of plans for the sale of common and preferred stocks to increase equity of Independent companies.

(9) Elimination of overlapping and "Free Service."

Speakers at the recent "Workshop" stressed the importance of the various assistance items and pointed up methods the committee plans to use in accomplishing its objectives. Industry members appearing on the program were: Missouri Association President George A. Hearne; Joe Roberts, Gallatin; Mr. Van Horn; Missouri Association Secretary R. W. Hedrick, Jefferson City; Henry Altepeter, advisory engineer to the Small Company Committee; and Ralph Duffy, Richard Kieselbach, Alex Hamilton, Homer Thorp, and Paul Christian, all from the Missouri Public Service Commission. — THE END.

"New Federal economies must be sought out to bring a balanced budget in sight. It has to be done because an unbalanced budget means more inflation, an unsound dollar, and higher living costs for all of us."—Titusville (Fla.) Star-Advocate.

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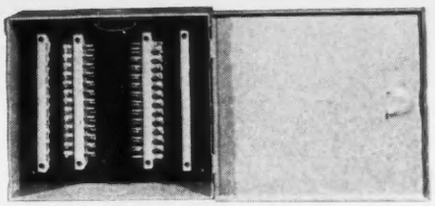

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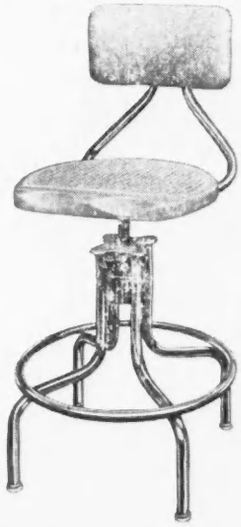

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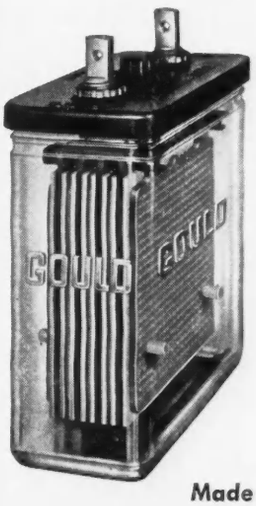
Literally "by request"—this new operator's chair retains all the posture advantages for which Sturgis is famed and adds the cool, clean comfort of a *cane* seat. The posture-curved, well-cushioned back rest is covered in genuine leather.

The exclusive Sturgis "Follow-Flex" feature automatically adjusts to the operator's every movement, supports her restfully all the time, discourages fatigue, keeps her at top efficiency.

Other new and welcome features include a plastic-coated steel foot ring which retains its color and a handy purse holder, available on request. Six seat heights, all adjustable.

the battery that lasts practically forever



gould planté

For long life and uniform dependable service, no other telephone battery equals the Gould Planté. It has rolled up amazing performance records, remaining in active full-float service for 20 years, 30 years and longer!

In the Planté, *all* of each positive plate is pure lead, containing *no* antimonial impurities. Thus, Gould has eliminated the primary cause of self-discharge, capacity losses and shortened battery life. Planté batteries float at constant voltage and maintain rated capacity all their life. Because they almost never need service, maintenance is negligible. If you would cut battery costs to a minimum, choose Planté.

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FIGURE ONE: — General of Pennsylvania has a new on the job coin box collectors's car — a Willys Sedan Delivery.

LITTLE WILLY

By MILDRED FEDEROFF
Assistant Editor, "The Mouthpiece"
General Tel. Co. of Pennsylvania, Erie.

"WILLY" is doing a big job for General of Pennsylvania. In addition to its service as a coin collector car, "Willy" is an economical vehicle to run and an easy car to drive.

WHEN BUYING a car, a few selling features are the horse power, long streamlined chassis, and a continental look, but General Telephone Co. of Pennsylvania skipped over these lightly and looked for more stable highlights when buying a working car. That is how a Willy's sedan delivery (*See Figure One*) used for telephone paystation coin box collections came to bear our company seal.

Willy's horse power engine is not equivalent to the new super-deluxe models on the market, and he has no long slender lines — in fact he's short and stocky — but although Willy will never win any international beauty contest he has other merits which give him the distinction of being the "best coin collector's car" on the market.

Coin collector's cars have always been a problem to telephone companies. Space in an ordinary passenger car is inadequate for housing coin boxes conveniently. Many safety restrictions were also nuisances such as locking the car when leaving it for a few minutes and keeping the windows shut while parked — even when the temperature registered ninety degrees.

When it became evident that a specially equipped vehicle was needed for paystation collections, General Telephone Co. of Pennsylvania sent a general alarm to telephone companies asking, "*What do you use for a coin collector's car?*"

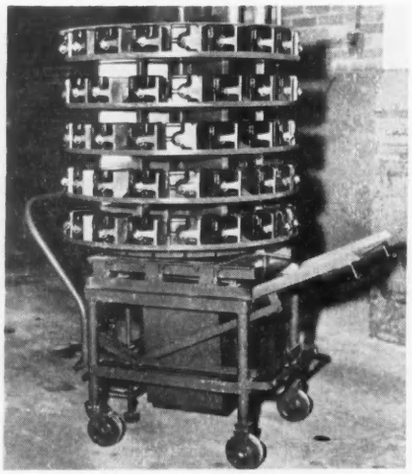

FIGURE TWO: — The cart and tray equipment are part of the special equipment installed in the Willys.

It was found that the New Jersey Bell Telephone Co. had the answer to the problem. They used a Willy's sedan delivery equipped with special equipment designed by R. J. L. McGurie, public telephone manager, Bell Telephone Company of New Jersey in Newark.

A thorough study made by that company showed that besides its adaptability to a coin collector car this sedan is an economical vehicle to run and a maneuverable car to drive.

Willy's recommendations came high, so without any customary entrance exam he was hired and the special equipment was ordered for him.

The cart and tray stack (*Figure Two*) are part of the special equipment installed in the Willys. The cart which consists of a welded metal framework mounted on casters is used to load and unload the tray stack onto and from the car. The tray stack consists of five circular

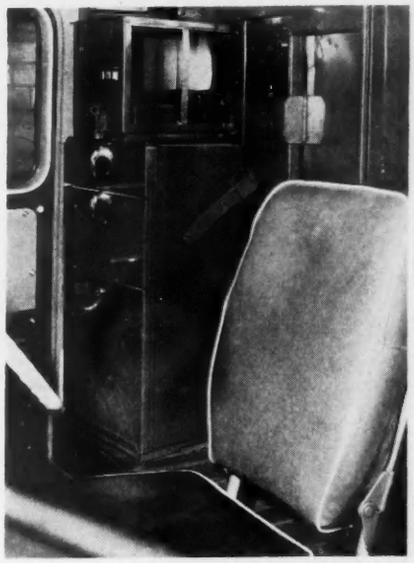

FIGURE THREE: — The partition assembly consists of a sheet steel partition with a sliding door and a cabinet assembly to hold such materials as directories, coin boxes and instruction cords.

trays attached one above the other to a vertical shaft, in the manner of a rotary file. The tray stack is loaded onto the car from the cart, locked into place at top and bottom, and the coin boxes for the tray stack are removed and replaced from the front of the car. Special "Tracks" are bolted to the floor of the car, and the tray stack is rolled onto these tracks.

The Partition Assembly (*Figure Three*) consists of a sheet steel partition with a sliding door, and a cabinet assembly to hold such materials as directories, coin box cases, and instruction cards. The sliding door when closed, locks by means of a snap lock.

A Wheel Lock Assembly (*Figure*

Please Turn To Page 94

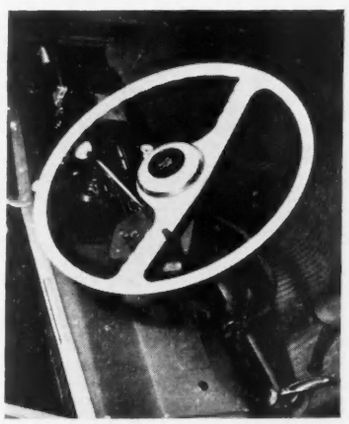

FIGURE FOUR: — A wheel lock assembly is attached to the steering post of the car and is connected to the ignition system.

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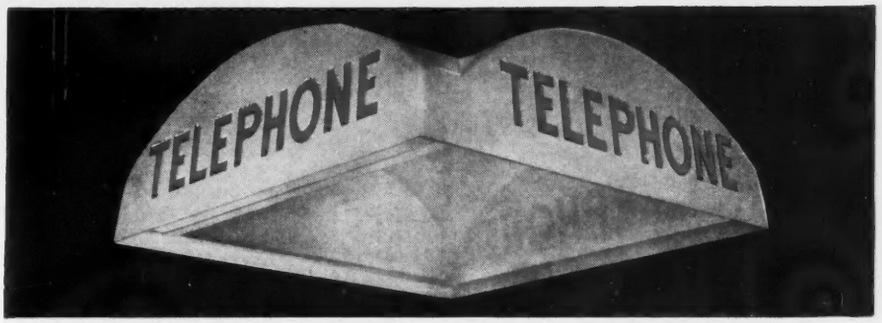
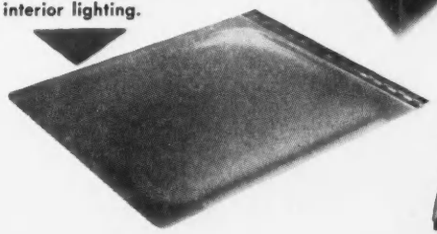


ADD one 32 watt fluorescent lamp unit complete with wiring and Ripley Light Watchman Control.

ADD one translucent Plexiglas GLO-CEILING for bright, yet soft, interior lighting.



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Long Storage Battery Life is assured by using the RB Electrox Automatic Charger, it maintains charging rate in proportion to drain on batteries. Humless operation permits charging while telephone system is in use. Made by SCHAUER MFG. CORP.

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New Plastic Wire Guards meet the need for auxiliary protection on telephone drop wire. "E" Guards, shown below, are used for the protection of station wires where attached to walls or passed through partitions. DETROIT MACOID CORP.

The Expanding Plates and Spreader Arms of Everstick Anchors insure 100% safety and maximum holding power under excessive strain. Ribbed base plate allows anchor to be locked solidly on rod. Quickly installed. Made by EVERSTICK ANCHOR CO.

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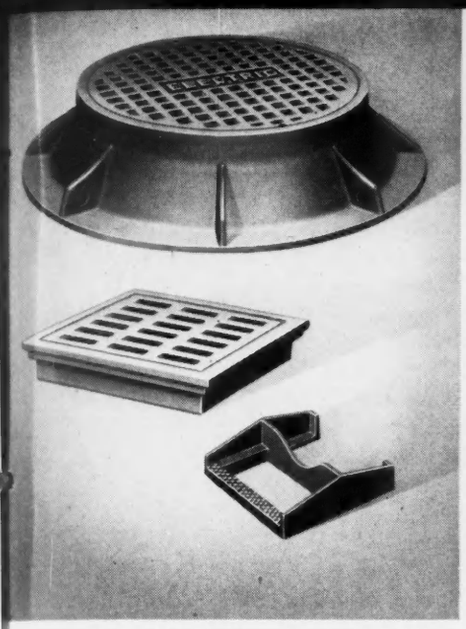
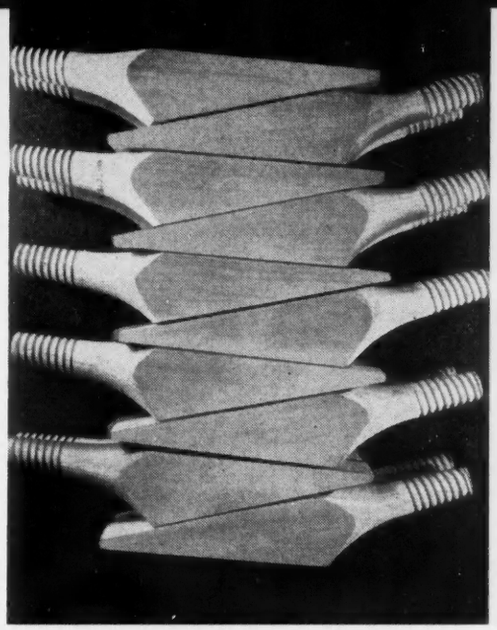


Complete Line of Construction Castings for Underground Electric or Telephone Service. Shown are manhole frame and cover; sump and catch basin frame and grate; and cast iron manhole steps. For service and quality use NEENAH FOUNDRY CO. products.



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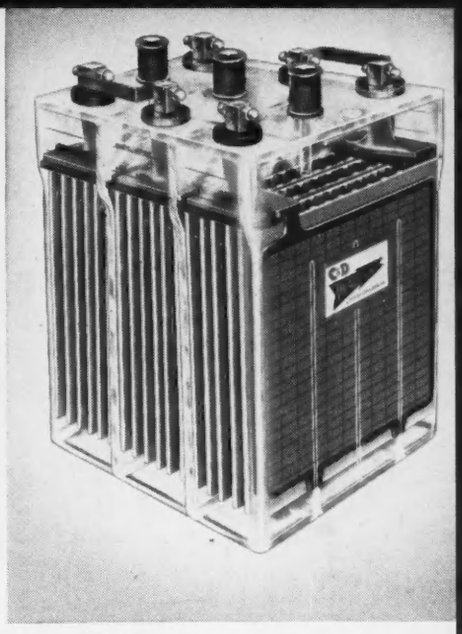

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Four) is attached to the steering post of the car and is connected to the ignition system. Then the assembly is locked, the ignition is off, and the steering wheel is locked by means of a pronged unit, extending up on both sides of the cross bar on the steering wheel. This Wheel Lock Assembly makes it possible for the Collector to leave the front of the car open when he is making collections.

Willy's working span is approximately three and one half years, so he may never receive a service pin. Nevertheless in that short span he will more than earn a place in the telephone equipment hall of fame — modern telephone equipment for a modern telephone company. — (*Reprinted from* THE MOUTHPIECE, *published for employes of the General Telephone Co. of Pennsylvania.*)

General Tel. Reports Net Income Increase

CONSOLIDATED net income of the General Telephone Corp. for the year ended Jan. 31, was $14,160,000, as compared with $8,979,000 for the 12 months ended Jan. 31, 1953, while consolidated net income for the first month of this year was $1,223,000, against $1,015,000 for the same period of 1953.

Consolidated operating revenues of telephone subsidiaries for the month ended Jan. 31, 1954 totaled $11,260,000, as compared with $9,832,000 for the same period of last year. For the 12 months ended Jan. 21, operating revenues totalled $129,374,000 as compared with $102,872,000 for the year earlier.

General Of Calif. Reports 10% Station Gain

THE GENERAL Telephone Co. of California, now in its 25th year of serving a large segment of the southern part of that state, last year made gross additions to plant of $31,046,714 and had a net gain of 51,359 telephones, bringing the total at the end of 1953 to 573,337, of which 98.1% are dial operated, Edwin M. Blakeslee said last month in his annual report to stockholders. Total plant in service at the end of 1953 was $157,277,976.

"From our 1953 experience," Mr. Blakeslee said, "it appears that the heavy demand for new telephone service has not abated. Although the company, as in the previous year, was again able to keep abreast of the new demand for service presented during the year, there were still 5600 unfilled applications on hand at the year's end as compared with 6400 at the end of 1952."

(In a separate report last month, General of California reported it had added more than 7500 new telephones so far in 1954 bringing the total at the end of February to 584,509. With additions averaging 4000 per month, General expects to reach a total of 600,000 telephones by October of this year.)

While increasing the number of telephones by about 10% last year, General of California recorded total operating revenues of $47,520,475, a 31.6% increase over the $36,112,804 figure of 1952. Operating expenses and taxes rose 30.9% to $38,903,324. Net income for 1953 was $6,974,718 as against $5,008,401 for 1952.

General of Indiana Reports Progress in '53

ALTHOUGH General Telephone Co. of Indiana made "substantial progress" in expanding and improving service during 1953, the company must continue its construction program during the current year with $3,300,000 in expenditures contemplated to improve service for present subscribers and meet growing needs, President H. E. Hussey stated last month in the annual report to stockholders.

Mr. Hussey said the 1954 improvement program includes proposed conversion of eight additional offices, serving 3300 telephones, from magneto to fully automatic dial service, and installation of an estimated 5200 telephones during the year. Mr. Hussey cited the industrial development in the company's 37-exchange territory.

General Of Southwest Reports Busy 1953

THE GENERAL Telephone Co. of the Southwest, which spent $6,461,000 for additions, improvements and replacements during 1953, plans to match this amount in carrying out its construction program this year, President Walter G. Wright stated in his annual report issued last month.

The report noted that through acquisitions and the expansion pro-

gram, the number of telephones served reached 166,257 at the end of 1953, a net gain of 26.8% over the previous year. At the end of the year, 140 of the company's 240 exchanges were dial operated. Sixty-eight per cent of telephones in service on Dec. 31, or 112,605, were dial, compared with 56% at the beginning of last year.

Operating revenues last year amounted to $13,399,912, against $10,614,000 the previous year; total operating expenses for the year were $11,372,000 against $9,092,000; and net income was $1,422,000, compared with $1,046,000 for 1952.

Inter-Mountain Reports "Busiest" Year

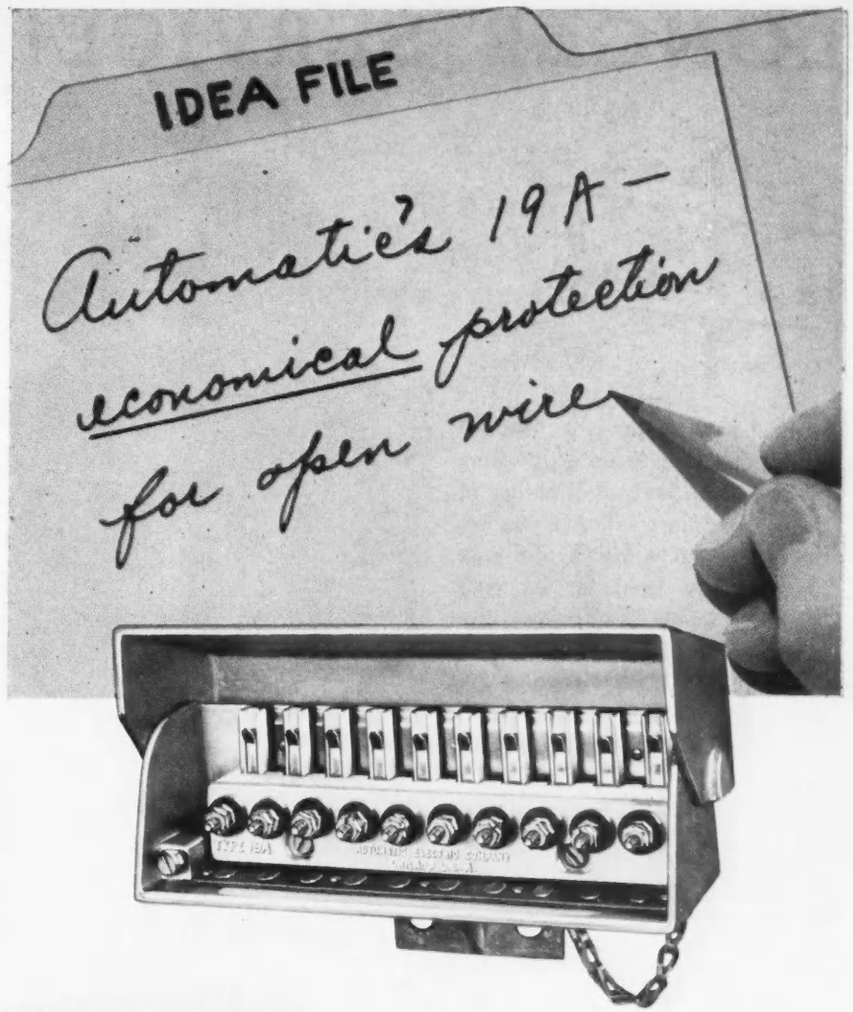
EXPERIENCING one of its busiest years, the Inter-Mountain Telephone Co., Bristol, Tenn.-Va., in 1953 handled more calls and added more telephones (5532) than in any previous year in its history, the annual report to stockholders reveals. Approximately 35 percent of the telephones gained were in rural areas.

In the report issued last month, President Kelley McNish stated that total operating revenues for 1953 were $4,590,708, as compared with $4,030,085 in 1952; total operating expenses were $2,922,663 for 1953 against $2,704,617 in 1952; and net income for the year amounted to $551,548, compared with $397,290 for the previous year.

The report noted that during the past 10 years the company's investment in telephone plant, with all but seven of the 35 exchanges being dial operated, has grown from slightly over $3,000,000 to over $14,000,000, while telephones have increased from about 31,000 to over 70,000. Gross additions to plant in service in 1953 amounted to $2,609,364, and the company plans a more than $5,000,000 expansion program in the 1954-55 period. Mr. McNish's report cited that John E. Sexton, Vice President of the company since 1947, was elected one of the two new Directors when the board was enlarged to nine members.

B. C. Telephone Co. Reports Record Gains

DURING 1953, the British Columbia Telephone Co. "exceeded all previous records for net gain in telephones and also for expenditures for new plant." President Gorden Farrell



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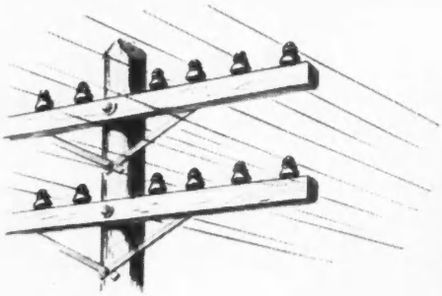

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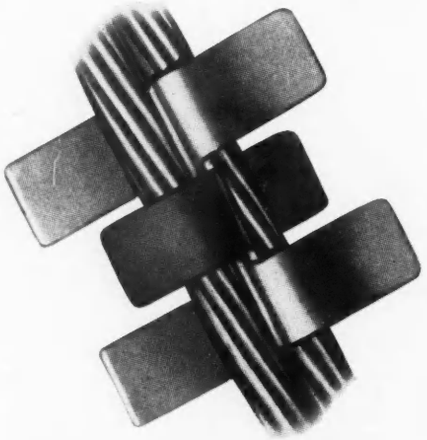

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stated in the annual report issued to stockholders.

The increase in telephones in 1953 totalled 25,743, compared with the previous high mark of 21,573 in 1952; gross plant additions last year amounted to a record $15,550,398, compared with the former high point of $11,349,578 reached in 1952. Since the war, the report pointed out, expenditures for plant and equipment have amounted to $70,500,000, with a $23,000,000 program currently under way.

The report shows that both local and long-distance calling set new records for volume in 1953. Local calling increased to about 1,580,000 calls per average business day, and long-distance traffic reached a total of 6,917,495 completed calls for the year, an increase of 5.81% over the previous year.

During 1953 hundreds of miles of new circuits were added, Mr. Farrell stated. Almost $1,500,000 was spent on improving and increasing long distance facilities during the year.

New AT&T Microwave Relay Channels Approved

THE AMERICAN Telephone & Telegraph Co. last month received FCC approval for new microwave relay facilities to provide two eastbound and one westbound channel between Tobacco Row Mountain and Lynchburg, Va. One channel in each direction will be used for extending Tobacco Row Mountain-Roanoke, Va., channels to Lynchburg and the other eastbound path will be used to provide video service to station WLVA-TV at Lynchburg, which is now provided over a protection channel. The project will cost about $50,000.

Britons Urge U. S. Telephone Methods

THE BRITISH Postoffice was urged last month to change maintenance methods in its government operated telephone service to conform with those of America's private telephone companies.

The suggestion came in the report of a team of British telephone technicians who returned from a study tour of the United States. The team is the first of 70 such visiting groups.

The team, which made Chicago one of its study stops and visited offices and plants of seven telephone concerns in the city and elsewhere in

Illinois, listed as its most important recommendation the introduction in Britain of the American "qualitative maintenance policy."

This system by-passes preventive maintenance in favor of snap checks and detailed attention to faults as reported. The system, the team said, has achieved a 20 per cent saving and a more effective use of manpower in America. It said the system, if applied by the British Postoffice, would save about 3 million dollars a year.

America's telephone network, serviced by 5,000 companies, is eight times as large as Britain's. Yet the team found that the average American exchange is more efficiently maintained — and with fewer employes — than the average British exchange.

The Britons also found that the American subscriber is more satisfied with his telephone service than is his British counterpart. They attributed this to the skillful use of publicity by American companies and the courtesy of employes. They said that "the lesson from America is that high productivity in a service can be spoiled by a 'take it or leave it' attitude on the part of the administration or of an employe."

The British postoffice, the team said, should intensify and extend publicity in its telephone service along American lines.

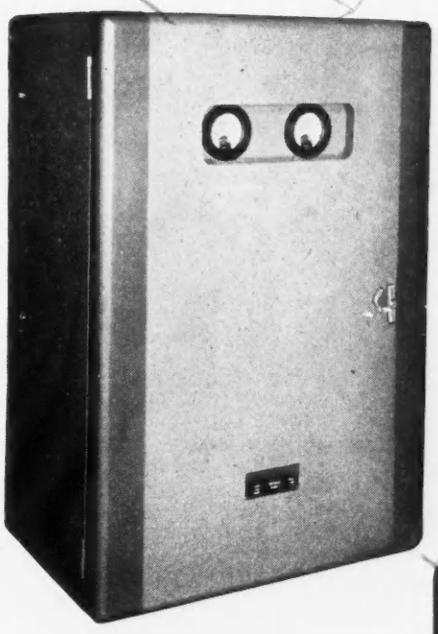
Another recommendation is for a new approach in Britian to the problem of controlling dust, a frequent cause of trouble in automatic exchanges. Because of better cleaning and ventilating devices, American exchanges are generally cleaner than those in this country, the team said.

Stromberg-Carlson Offers Complete Microwave Systems

COMPLETE microwave radio relay systems especially designed for telephone circuits was made available to Independent telephone companies by the Stromberg-Carlson Co., Rochester, N. Y., beginning April 1, John H. Voss, general manager, Telephone Division, announced March 1.

The microwave radio relay portions of the system will be manufactured for Stromberg-Carlson by the Radio Corporation of America, and will be similar to RCA microwave communications equipment already in use by a number of utilities, pipe lines and other industries in this

A LONGER LIFE LINE FOR YOUR BATTERIES



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To provide extreme accuracy of electronic control and the exceptional reliability demanded by this type of service, Power Equipment engineers designed this PEC626 type Automatic Battery Charger by starting with the rugged components of a manual charger, then added a magnetic system for coarse voltage control and a simplified electronic system for fine voltage control.

As an illustration of the accuracy of the PECO charger, this example can be used: the DC output is sufficient to maintain 60 lead acid battery cells at 129 volts; it will also furnish power to switchboard loads within the rating of the charger, and at all times the output voltage is automatically regulated to within ± 0.5 per cent, for AC line voltage fluctuations of ± 5 volts on a 230 volt circuit.

Exceptional reliability is shown by the fact that if the electronic control section should be disconnected, the magnetic control section will still automatically hold the output voltage to within ± 3 per cent of nominal voltage.

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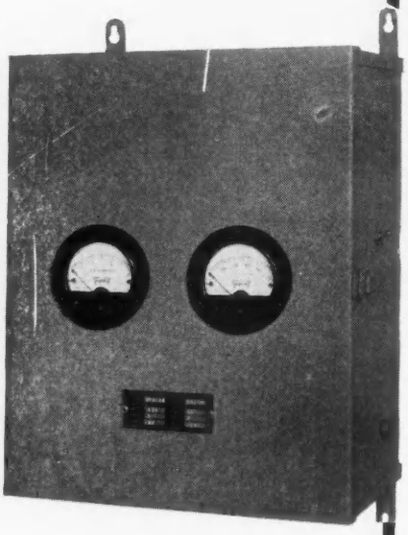

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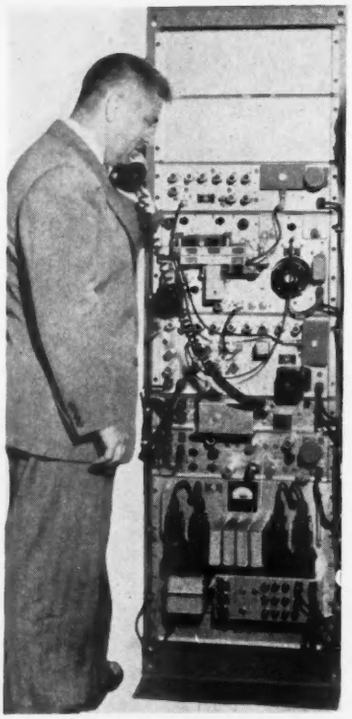


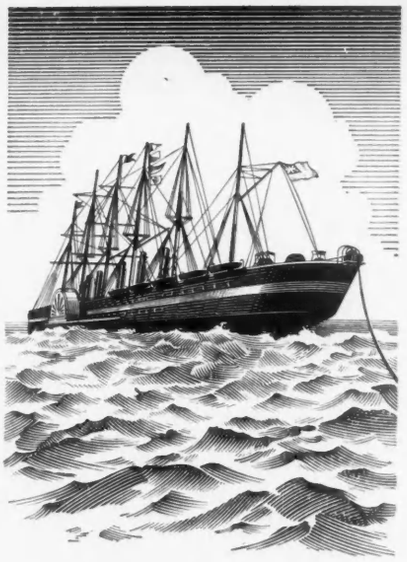
MAURY STATON of the RCA engineering staff, is shown with one of the relay units of the SC-26 microwave systems made available April 1 to Independent telephone Companies by the Stromberg-Carlson Co., Rochester, N. Y.

country and abroad, Mr. Voss said. The SETCO Division of Stromberg-Carlson in Dallas, Texas, will manufacture the multiplexing and channeling equipment for the system.

An RCA telephone radio relay system is used by the Northwest Telephone Co. in Canada, serving an area extending from Vancouver 220 miles north to Alert Bay, and providing economical communications in a region where wire or cable lines would have been prohibitively costly.

In order to obtain maximum use of the frequencies available and to provide reliable and economical operation, the systems are of the single-sideband suppressed carrier multiplex type, operating in the frequency range of 2450 to 2500 megacycles. They provide duplex radio circuits capable of accommodating up to 30 voice channels.

According to Stromberg-Carlson Co. this type of telephone microwave system, known as Model SC-26, is easily co-ordinated with existing telephone equipment of either manual or dial types. The SETCO multiplexing system used in the SC-26 employs conventional type equipment such as has been in use for many years on wire lines. It permits the voice chan-



Spanning the Ocean

July 27, 1866 marks a famous day in communication history. For, after four failures, the Atlantic cable was permanently completed from Valentia, Ireland, to Trinity Bay, Newfoundland. Merchants in Chicago and New York were only minutes, rather than weeks, away from merchants in London and Amsterdam.

It is significant to note that the first Hemingray Glass Insulators were made in this same era. In fact, for 84 years now, Hemingray has been dependably serving the communication systems of the world.

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nels to be multiplexed over suitable wire lines and then connected directly into the microwave relay equipment. And, as it lends itself readily to dropping or adding channels, and to party-line operation, it provides wide flexibility of service.

Use of this frequency range makes it possible to employ standard long-life triode tubes. Circuitry is simple, and these factors combine to keep maintenance costs at a minmum. This frequency range also has fewer restrictions so costs of towers and other installation items are low.

The system is designed for unattended operation and includes emergency power and standby equipment wherever needed. Where repeater or terminal stations are in remote locations, they are equipped with suitable fault-indicating equipment which automatically transmits indications of irregular operation to terminal or maintenance points. Thus trouble can be quickly located and maintenance speeded.

Transmitters and receivers are connected to a single antenna using either gas or air filled coaxial cable. The systems are not critical to power source voltage or frequency changes and so do not require closely regulated power supplies.

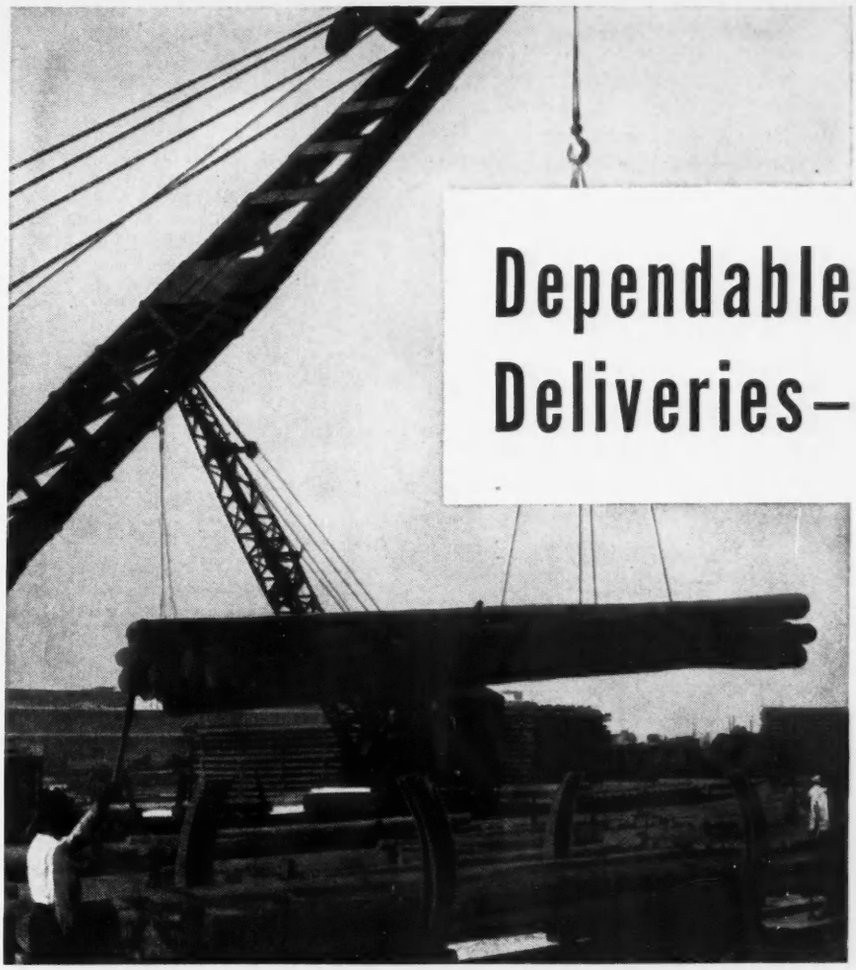
The SC-26 telephone microwave system allows any or all channels to be dropped or picked up at any repeater station, and this too, increases flexibility of the system.

Since microwave equipment is localized, all maintenance work can be concentrated in a few locations, thus realizing economies in manpower and equipment. This also provides improved service through the faster correction of system faults.

The system also is designed so that, if a break occurs at some point along the circuit, each portion of the system continues to function on either side of the break. Thus a disruption does not disable the entire system.

As the microwave system replaces long distance wire and cable lines, it greatly reduces the hazards of weather damage, vandalism, or sabotage, and virtually eliminates the possibility of interruptions resulting from automobile accidents.

The Stromberg-Carlson Telephone Division will coordinate the new microwave system with other telephone equipment, and will supply a consulting service to assist in plan-



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ning microwave installations. The SETCO Division of Stromberg-Carlson will manufacture and supply SETCO multiplexing, channeling and other auxiliary equipment, and the Stromberg-Carlson Credit Corp. facilities are available for financing.

Kellogg Swbd. Creates New Sales Divisions

O. C. BAILEY, assistant sales manager of Kellogg Switchboard & Supply Co., a division of International Telephone & Telegraph Corp., has announced the appointments of R. H. Smythe and J. T. Robertson as managers of newly created sales divisions.

Mr. Smythe will take over the Southeastern Division with his headquarters in Atlanta, Ga. He joined the Kellogg company's Southwestern Division in 1947. Prior to that time, he had been associated with his father in outside plant construction business.

R. H. SMYTHE, manager of Kellogg Switchboard & Supply Co.'s Southeastern Division.

Mr. Robertson has been appointed manager of the Northeastern Division and will have offices in Elmira, N. Y. Mr. Robertson, who has been active in both the foreign and domestic telecommunication field for over 18 years, joined the Kellogg company in 1951 as a crossbar equipment engineer. In 1952, he was assigned to the Chicago sales office as a sales engineer.

Kellogg now has eight sales divisions. Other divisions include: Western (Kansas City); Pacific Coast (San Francisco); Southwest (Dallas, Texas); Chicago (Illinois); Northwsetern (St. Paul, Minnesota); and Central (Mansfield, Ohio).

J. T. ROBERTSON, manager of Kellogg Switchboard & Supply Co.'s Northeastern Division .

Chester Moore Retires from Automatic Electric

CHESTER C. MOORE, until recently East Central District sales manager for Automatic Electric Sales Corp., Chicago, retired March 31 after nearly 45 years of service with the Automatic Electric group. In his various capacities over the years Mr. Moore has established a wide circle of friends in the telephone industry from coast to coast.

An electrical engineering graduate of Ohio State University, Mr. Moore joined Automatic Electric in 1909. Installation assignments in various parts of the middle west followed soon afterwards, including the original automatic installations at Buffalo, New York.

Shortly after his marriage to Marie Rugh of Lancaster, Ohio, he was transferred in 1913 to New York City as assistant manager of the sales office there. In 1920 he was promoted to manager of Automatic Electric's Cleveland office, and later was transferred to Los Angeles for two years. Since returning to Chicago in 1928 he has served as sales engineer and district manager for several different territories. Since January 18, when his assignment as East Central District sales manager was taken over by R. B. Liepold, he has been serving as a special consultant for Automatic Electric Sales Corp.

CHESTER MOORE

H. F. Lello Elected President Of Automatic Electric Sales

ANNOUNCEMENT has been made of the election of H. F. Lello as president of Automatic Electric Sales Corp., domestic distributing company for the products of Automatic Electric Co., Chicago. Mr. Lello assumed this new post on April 1, succeeding L. H. Warner, who resigned March 31 to join the General Telephone System as president of Leich Electric Co. and Leich Sales Corp.

H. F. LELLO

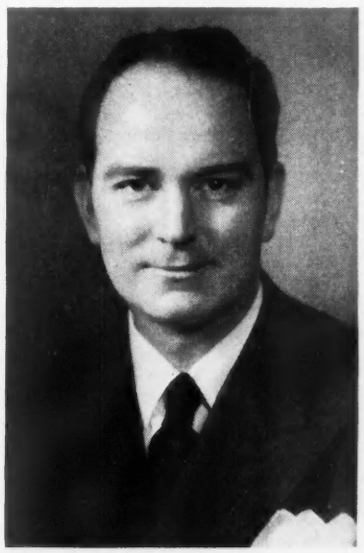
Concurrent with this change, Mr. Lello, who has been vice president and general manager of Automatic Electric Co. since September 1, 1947, was elected executive vice-president of that company.

Prior to becoming vice-president

and general manager of Automatic Electric Co., Mr. Lello was for several years engaged in various administrative capacities with the sales organization. He first joined Automatic Electric Sales Corp. in 1939 after 16 years with the manufacturing organization, and became sales manager in 1944. Two years later he was elected vice president and general manager of the Sales company, and early in 1947 became president of that company. This is the position he now re-assumes in addition to his responsibilities as executive vice-president of the manufacturing company. In the intervening years he has maintained close contact with the sales organization and a keen interest in its operations in serving customers in both the telephone and industrial fields.

L. H. Warner Elected Pres. of Leich Company

LESLIE H. WARNER was elected president of Leich Electric Co., Chicago, and of its wholly owned subsidiary Leich Sales Corp., at a special meeting of the board of directors



LESLIE H. WARNER

effective March 31, 1954. Leich Electric Co. is part of General Telephone System and announcement of this organization change was made by Donald C. Power, president of General Telephone Corp. Mr. Warner was also elected to the boards of Leich Electric Co. and Leich Sales Corp.

Resigning President of Leich Electric Co. and Leich Sales Corp., Roy W. Siemund, will remain as one of Leich's directors. For some time Mr. Siemund has wanted to retire

Please Turn To Page 104

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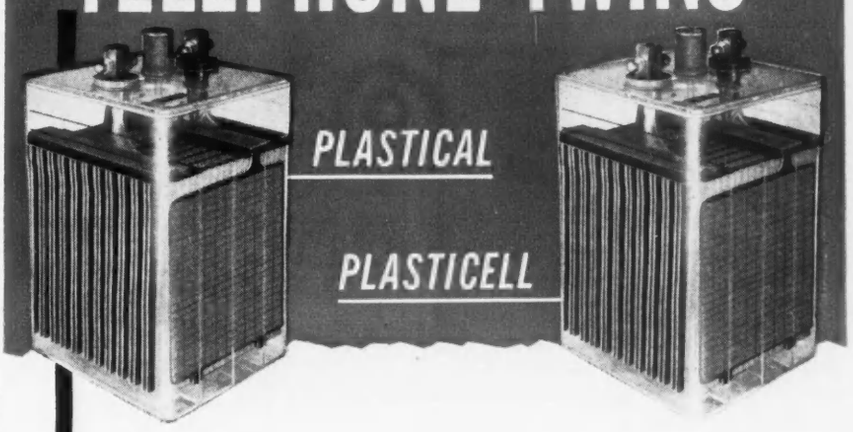
TELEPHONE TWINS



To meet your telephone battery needs you can find the answer in one of C&D's "Telephone Twins"—PlastiCal and PlastiCell.

For maximum life—estimated at 25 years—specify C&D PlastiCal, our lead-calcium type. For conventional or normal installations, specify C&D PlastiCell, our standard telephone battery. Both are specifically designed for telephone service and both give you:

1. **Extra-long life**
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C&D batteries for the telephone industry are available through your equipment and supply distributor. Consult him, or write us for Bulletins T-527 (PlastiCell) and T-528 (PlastiCal).

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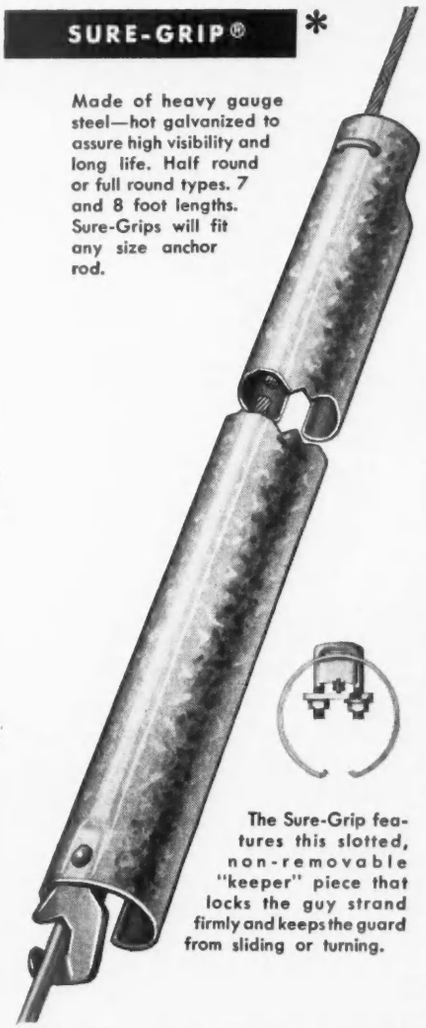
SURE-GRIP® *

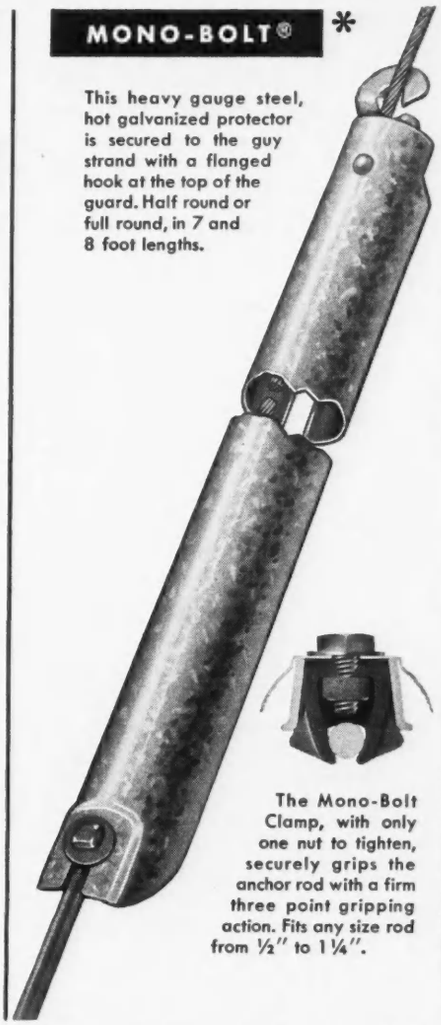
Made of heavy gauge steel—hot galvanized to assure high visibility and long life. Half round or full round types. 7 and 8 foot lengths. Sure-Grips will fit any size anchor rod.



The Sure-Grip features this slotted, non-removable "keeper" piece that locks the guy strand firmly and keeps the guard from sliding or turning.

MONO-BOLT® *

This heavy gauge steel, hot galvanized protector is secured to the guy strand with a flanged hook at the top of the guard. Half round or full round, in 7 and 8 foot lengths.



The Mono-Bolt Clamp, with only one nut to tighten, securely grips the anchor rod with a firm three point gripping action. Fits any size rod from ½" to 1¼".

MATTHEWS †

These half round guards save a lot of space on trucks and in storage, because they nest together. Matthews Guards are exceptionally strong—made of galvanized steel. Available in 7 and 8 foot lengths.

The patented upper clamping member is an integral part of the guard and securely locks on the guy wire. The lower end of the guard fastens to the guy clamp bolt.

Only Chance offers such a complete line of guy guards to meet your installation requirements. The line includes the service proved Sure-Grip, popular with linemen because there is nothing to take apart and re-assemble—no loose parts to lose. More than a million Sure-Grips are in use throughout the country . . . that's proof of the success of this protector.

Another favorite is the Chance Mono-Bolt, standard choice of hundreds of utilities. The Mono-Bolt combines normal guy wire protection requirements—safety, durability, and economy—with a simple installation method.

The Matthews Guy Guard cannot be turned or twisted on the guy wire. These one piece protectors are designed to cover the guy rod and wire to the ground line even if the rod barely extends above the ground.

* *Made by Specialty Devices Company, Subsidiary of A. B. Chance Co.*

† *A product of the A. B. Chance Company Matthews Plant.*

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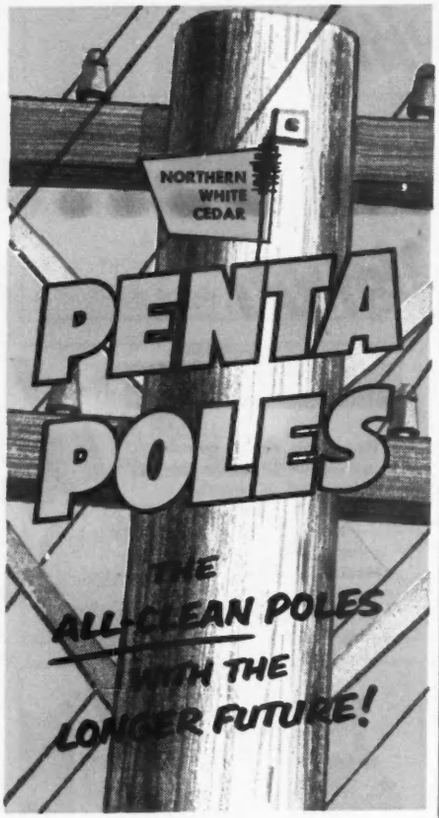

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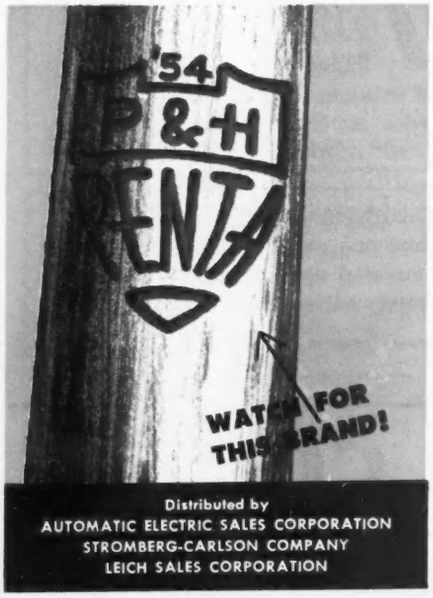

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as active head of the Leich companies in order to spend more time with his family who, because of Mrs. Siemund's health, now resides in Tucson, Arizona. Mr. Power stated General Telephone System's position when he said, "We are delighted and fortunate to secure the service of such a fine executive as Les Warner, but we shall all miss the great ability and fine personality of Roy Siemund who has been 'Mr. Leich Electric' for so many years."

Mr. Warner will bring to General Telephone System a fine background of telephone sales and technical experience which will make him ideally equipped to guide the future development of the Leich companies.

Born in Corsicana, Texas, Mr. Warner graduated from the University of Wichita (Kansas) as an Electrical Engineer and then received a Masters Degree from the Harvard Graduate School of Business Administration. He has worked for the Long Lines Department of American Telephone & Telegraph Company and most recently was President of Automatic Electric Sales Corporation. Previous positions held at Automatic Electric include special assignments for the president, managing director of Automatic Telephones Limited of Brazil, vice president of Eastern District Sales with headquarters in New York, and commercial manager of Automatic Electric Co.

On July 16, 1940 Mr. Warner married Miss Mary Jordana Billings in Sao Paulo, Brazil. The Warners make their home in Winnetka, Illinois and have two children, Rosalind and Ross.

G. K. Beare Named Vice-Pres. Of Automatic Electric

AUTOMATIC ELECTRIC Co. has announced the election of G. K. Beare, formerly production manager, as vice-president in charge of production, effective April 1.

The advancement of Mr. Beare to this post comes as a highly merited recognition of his achievements in the administration of Automatic's manufacturing organization since early in 1948, when he was appointed production manager. This six-year period has been marked by a steadily increasing demand for the company's products — a condition which has necessitated considerable expansion

G. K. BEARE

of production facilities in the face of difficulties imposed by the steadily increasing variety and complexity of modern telephone and communication equipment. In meeting these conditions, Mr. Beare has shown a high order of ability for organizing this expansion of staff and facilities and for administering the immense and complex organization which is required for efficient large scale production.

Mr. Beare received his technical training at Washington University, St. Louis, where he was awarded the degree of B. S. in M. E. in 1937. The following two years he attended the Harvard Graduate School of Business Administration where he received his M.B.A. degree. He joined Automatic Electric in June, 1939, and prior to his appointment as production manager served in a number of commercial capacities, becoming, in 1947, general commercial manager and general manager of the company's international affiliates.

Mr. Beare is a member of the American Society of Mechanical Engineers, a member of the Economic Club, and is affiliated with various other professional and commercial organizations.

Exide Literature Describes Emergency Lighting Equipment

PUBLICATION OF sales literature on a new line of Underwriters Laboratory approved auxiliary emergency lighting equipment has been announced by Exide Industrial Division of The Electric Storage Battery Co.

The four-page pamphlet is designed to assist architects, builders, con-

tractors, executives, engineers, purchasing agents and others needing such information, in selection of emergency lighting equipment. Schematics, layouts and illustrations of typical emergency lighting installations are supplemented by suggested specifications conforming with sections of the recently revised National Electrical Code dealing with 6-volt emergency lighting equipment.

The recently introduced Exide Lightguard Models M and T are featured. Illumination curves are included for the 6-volt battery supplied with these units, which utilize a storage battery specifically designed for emergency lighting use. Recommended installation procedures for emergency lighting equipment show how to get the most out of the equipment at minimum cost.

Copies of the Exide Lightguard pamphlet conveniently punched for insertion in standard 8½ x 11 three-ring binders, may be obtained by writing to The Electric Storage Battery Company, Box 8109, Philadelphia 1, Pa., specifying form 4808.

Roanwell Announces High Output Receiver

A WEAK SIGNAL coming from the receiver of a telephone handset has been a frequent cause of irritation and dissatisfaction among telephone subscribers. For example, telephone users in rural areas have for years been faced with the problem of poor voice reception where available power over long lines is limited. In conference calls too, a drastic reduction in response level is many times experienced when the incoming signal is divided between two or more telephones. And in noisy locations, a weak receiver response often seriously impairs intelligible telephone communication. All of these problems can be helped materially by the use of a new high output telephone receiver element recently announced by Roanwell Corp., 622 Pacific St., Brooklyn 17, N. Y. and known as type RA-1H.

According to the manufacturer, the RA-1H Receiver has approximately four times the acoustical energy of the commonly used telephone receiver.

This increase in energy is demonstrated by an output that is approximately 5 d.b. higher over the normal speech response range than the HA-1

Please turn to page 110

1500 pounds

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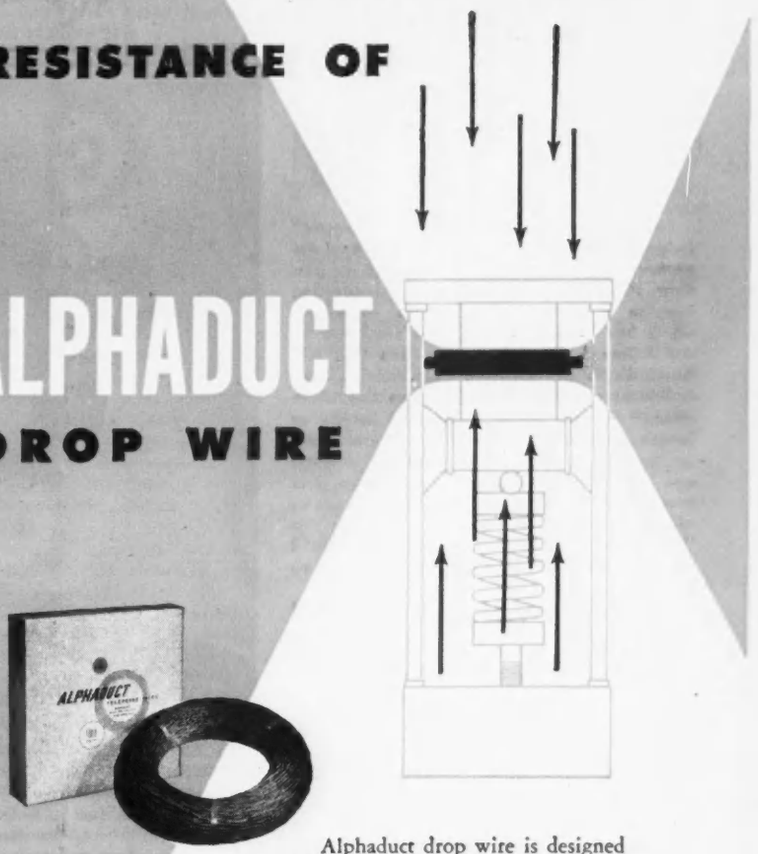

Alphaduct drop wire is designed and built to be the longest lasting drop wire you've ever installed. It's tested . . . completely, thoroughly and often to make sure that every single coil is up to Alphaduct's rigid standards.

Here's how the insulation is tested to make sure it won't crush.

Short lengths of Alphaduct are placed between the steel plates of a compression testing machine. These plates are then forced together at uniform speed until the insulation crushes. Alphaduct parallel drop wire has to withstand a minimum load of 1500 pounds before it breaks. Each conductor of Alphaduct twisted pair will withstand a 1000 pound pressure.

You don't have to worry about a little rough handling breaking down this kind of tested insulation. Try Alphaduct drop wire. It's dated, so you can see for yourself the extra wear it provides.

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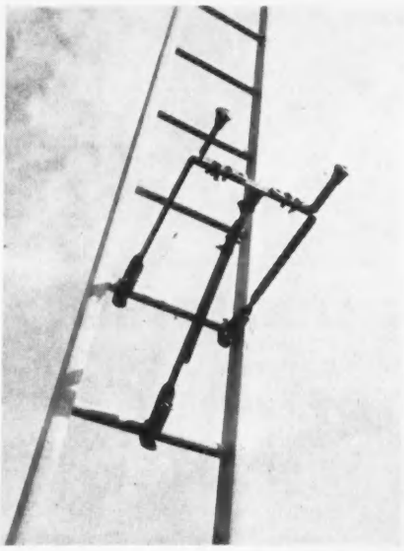


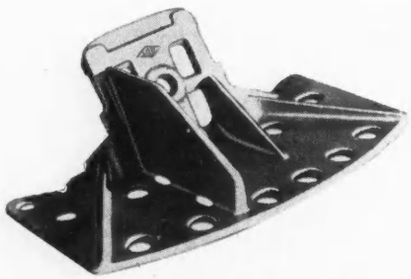
NEW PRODUCTS' SHOWCASE

LADDER JACK: — A new, "all-purpose" ladder jack, incorporating many new and important safety features and designed to perform virtually every holding and supporting function necessary for all types of ladder work, has been developed and marketed by the Allbee & Dunn Metal Products Co., 259 South Curtis St., Littleton, Colo.

This new ladder jack, known as the "Armstrong" is adjustable to use by width or length from the center, or back and forth on the legs. With the "Armstrong," ladders can be secured with safety on poles and trees of all sizes and dimensions, on corners of buildings, on flat walls and by using two "Armstrong" ladder jacks, you have a solid platform base for scaffolding work of all kinds.

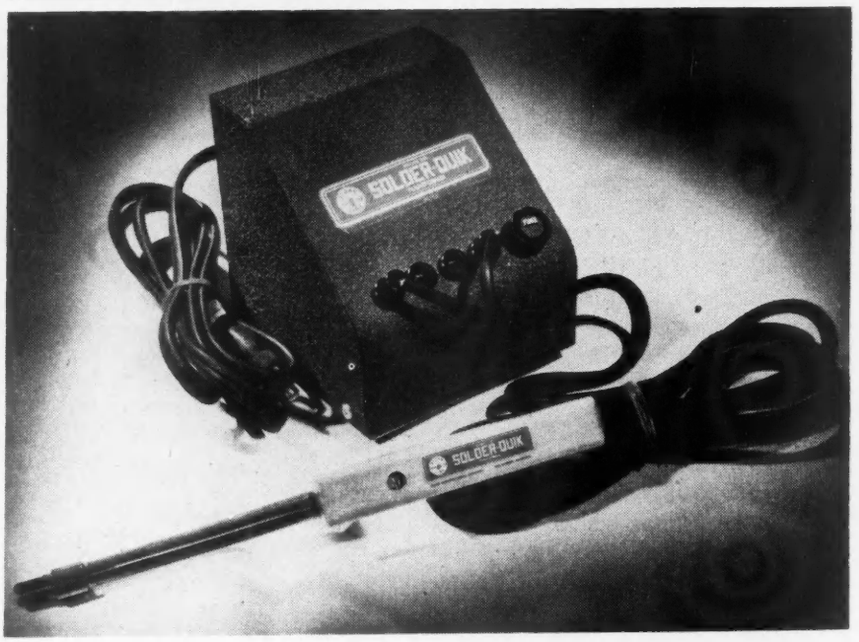
The "Armstrong," which is constructed of the finest grade steel, ¼" x 1¼" in width, is particularly adapted for use by carpenters, painters, roofers, sheet metal men, interior and exterior decorators, construction workers, telephone and light companies, maintenance and repair men and electricians. It is painted a high visibility yellow and safety tips of rubber are used on the legs.

"Armstrong" ladder jacks can also be custom-made for individual requirements. For full information, Check New Prdouct 603.



POLE BEARING PLATE:—The Malleable Iron Fittings Co., Banford, Conn. has developed a new Pole Bearing Plate made of malleable iron and employing the principle of the cone anchor. It provides increased bearing values while improving resistance to up-lift.

Easily installed with a single thru bolt and M.I.F.'s Grid Gains, a pair of Pole Bearing Plates add 180 sq. inches of bearing area. Reinforcing ribs check rotation and the cone effect resists up-lift. The curved perimeter keeps pole hole size to a minimum. One or more pairs of Pole Bearing Plates can be installed as necessary. They can be used at the ground line on existing structures to resist down-thrust.—For Complete Data, Check New Product 604.



"SOLDER-QUIK":—The Stark Manufacturing Co., of Tuscaloosa, Ala., has recently announced its Model 101 "Solder-Quik," designed for light, fast soldering on small work. It is especially recommended for operations involving small metal parts. Operating from regular 110 volt AC line through a step-down transformer, the "Solder-Quik" is said to be both safe and highly efficient.

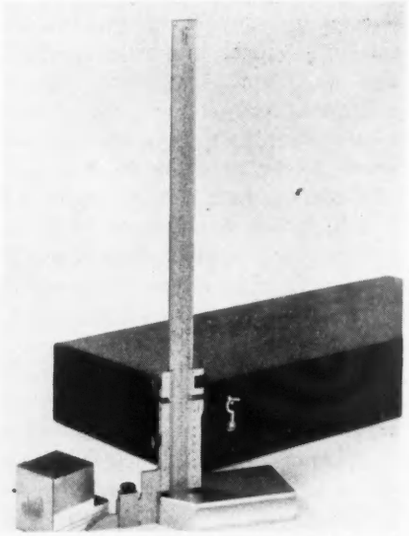
Soldering heat is obtained at the tip of the Solder-Quik by passing low voltage current through a small area of the work by means of two long-life carbon electrodes. Six heat ranges are available through a simple plug-in feature.

Outstanding advantages of the "Solder Quik" Model 101 are said to be its very light weight, accessibility to small spaces, and low power consumption. — For Complete Data, Check New Product 605.

HEIGHT GAGES: — The Geo. Scherr Co., 200 Lafayette St., New York 12, N. Y., has announced new improvements on its line of "Height Gages." In order to scribe or measure close to the plane of the surface, the conventional height gage requires an offset scriber which usually extends far out from the scale, lacking in rigidity. The improvement on the new Scherr tool consists in a base slotted in front to allow the short solid jaw with straight scribing point to reach down to the surface plate used. Thus marking and reading can start from the bottom with the vernier scale set to zero, resulting in increased accuracy and considerable saving in time.

A further improvement has been added by radical change in vernier reading. A vernier 2.450" long, divided into 50 lines, extends over 49 graduations of .050 each on the main scale. This makes the difference in division of the vernier and main scale large enough to read 1/1000" with the naked eye.

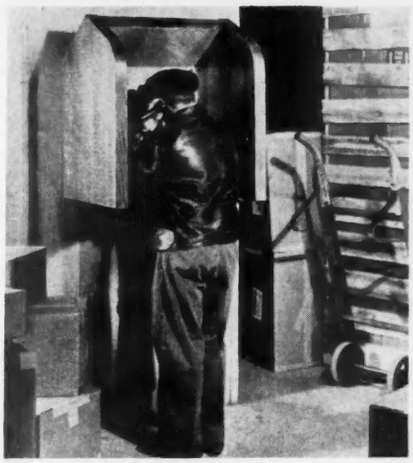
An open slide permits view of entire scale



resulting in faster reading and avoiding of errors. Stock sizes are of 10", 20" and 40" measuring capacity, attractively priced.

For illustrated circular describing the "Height Gage," Check New Product 606.

THE BUYERS' GUIDE



"ACOUSTI-BOOTH": — One problem that can be solved quickly and easily is the use of the telephone by outside truckers and other unauthorized persons who sometimes think nothing of adding toll calls to your subscriber's telephone bill. Dudley W. Day, vice president, Architectural Products Division, Burgess-Manning Company, 5970 Northwest Highway, Chicago, suggests the installation of a pay station, enclosed in the new and improved Scout Model 602 Acousti-Booth to eliminate toll call charges and at the same time provide convenient, quiet telephone service not only for visiting truck drivers but for your own shipping room personnel. These booths, which may be hung on a wall and take up little space, are lined with sound absorbing material, encased in perforated steel. The booth soaks up extraneous noise and makes telephoning easy even in the noisiest spots. A convenient pay telephone in an Acousti-Booth will solve the problem of providing telephone service for outside truckers, Mr. Day says. Acousti-Booths also are made in full length, doorless models. — For Complete Data, Check New Product 607.

SIGNAL ARRESTER: — A new valve type signal arrester that provides lightning protection for a-c circuits of 0-175 volts or d-c circuits of 0-30 volts is being manufactured by the Line Material Co., Milwaukee 1, Wis. The new arrester designated Type L, furnishes consistent sparkover, high discharge capacity, and low IR drop. Designed primarily for protecting railway signal systems, the Type L Arrester meets all requirements of the Association of American Railroads (Signal Section Specification). It may be applied to other low voltage systems, such as fire alarm circuits, remote metering circuits, airport lighting circuits, and relay circuits.

The Type L Signal Arrester consists of a precise spark gap and valve element in a clear plastic housing, all mounted on a strong Bakelite base. The arrester has a positive moisture-proof seal. Each unit is subjected to water-immersion and electrical tests before shipment. — For further information, Check New Product 608.

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BELTS — CLIMBERS — PLIERS — SAFETY STRAPS — CONSTRUCTION TOOLS. *Klein & Sons, Mathias. 3200 Belmont Ave., Chicago 18, Ill.*—[ADV. 4]

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CORDS, Switchboard & Telephone — *Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.*—[ADV. 9]

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POLES, Southern Yellow Pine — *Taylor Colquitt Company, 290 E. Main St., Spartanburgh, S. C.*—[ADV 18]

POLES, Southern Yellow Pine — *Texas Creosoting Co., Orange, Texas.*—[ADV. 19]

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WIRE, Telephone, *for all inside and outside uses — Whitney Blake Co., New Haven, Conn.*—[ADV. 25]

For complete information on the products and services described in this department send in the coupon which appears on this page. If you do not see a listing of the products and services that you are interested in, write BUYER'S GUIDE, 7720 N. Sheridan Road, Chicago 26, Ill. The information will be furnished quickly and without charge to telephone industry members.

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HELP WANTED—Opening April 1, 1954, for experienced Telephone Engineer. Civil Service, Grade GS-11; age no barrier. Starting Salary $5940 per annum with regular salary progression schedule. General background in telephony, with emphasis on technical and commercial experience desirable. Must be able to produce results without technical supervision. Position carries sole technical responsibilty for the procurement and administration of all telephone facilities and service for over 300 Naval activities in the Ninth Naval District, covering 13 Midwestern States. About 20% of work involves travel within district. Contact H. L. Reynolds, District Public Works Office, Great Lakes, Illinois.

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SWITCHBOARD EQUIPMENT MAN, experienced in common battery and magneto systems, permanent position — advancement opportunity. Reply should include references, experience, salary desired. Write Box 8885, Telephone Engineer Publishing Corporation, 7720 Sheridan Road, Chicago 26, Illinois.

CABLE SPLICERS, Equipment Installers, Station Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 6100 N. 20th, Philadelphia, Pennsylvania.

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Contact C. P. Clark, Liberty Hosiery Mills, Inc., Gibsonville, No. Carolina.

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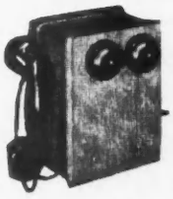

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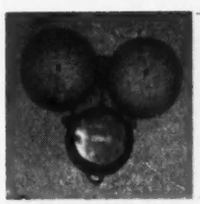

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W. H. MACKIN has been appointed sales manager, Holtzer-Cabot Telephone Equipment Divison, National Pneumatic Co., Inc., Boston, Mass. Mr. Mackin joined the company in Oct. 1951 as sales engineer in the Holtzer-Cabot Telephone Equipment Division. He replaces J. J. Anderson, who has been appointed general sales manager for all National Pneumatic and Holtzer-Cabot Divisions.

and is about equal to the output of the U-1 Receiver as used in the new Western Electric 500 series Handset. The RA-1H Receiver is dimensionally equivalent to the HA-1 and can therefore be used as a direct replacement in all telephone handsets originally designed to take an HA-1 or other similar elements.

For more detailed information, request Roanwell Data Sheet RR-1.

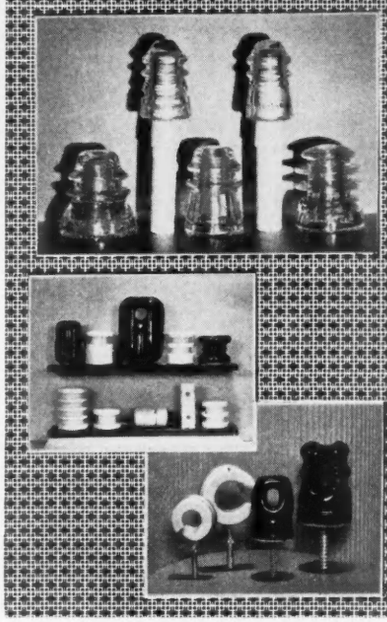
Reilley Tar Announces Personnel Changes

Dr. H. A. PERSYN has been appointed superintendent of the Fine Chemicals plant of Reilly Tar & Chemical Corp. Dr. Persyn joined Reilly in 1936 and was formerly superintendent of Reilly's Newark, N. J., plant and more recently, has been in charge of the Indianapolis Refinery.

T. E. Courtney has been put in charge of Reilly's new synthetic pyridine plant. With Reilly since 1929, Mr. Courtney had first been superintendent of the Indianapolis Tar Acid plant and then was in charge of the Fine Chemicals plant.

Dr. W. R. Wheeler who not only carried out the developmental work but who also put the pyridine plant on stream, and was responsible for its operations for the first nine months, is now back with the Research and Development Division where he is assistant director in charge of the development department.

For Satisfaction Order Them From Suttle Stock



Hemingray Glass

Fifty years ago Hemingray glass insulators stood for quality—today they still do — the five popular telephone styles are always in stock.

Porcelain Products Knobs

Careful mixing of the clays provides a uniform quality material highly resistant to breakage — along with accurately controlled "firing" PP knobs and insulators are of the finest quality you can buy.

Pearl Screw Brackets

Made at the Pearl factory—where the "Pearl" patent on the lead sealing originated—these are the genuine product with all the pride of the inventor behind the quality of the product.

See Your SUTTLE Catalog

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transmitter

Published by the famous makers of XY Equipment

VOL. 3 NO. 1 APRIL 1954

Stromberg-Carlson Telephone Microwave Systems

FOLLOWING the first announcement that Stromberg-Carlson now offers Telephone Microwave Systems to the Independent telephone industry, there has been unusual response in the form of inquiries concerning the use and merits of such a system as compared to wire-line communication. This article will give a brief general outline of Microwave as it would be used in the usual telephone application.

Carrier on a Radio Beam. Telephone men are familiar with the principles of wire-line carrier, for increasing communication channels over existing physical facilities. Telephone messages are changed to carrier frequencies for transmission to the terminal point, where they are again translated into normal audio message frequencies at the distant telephone.

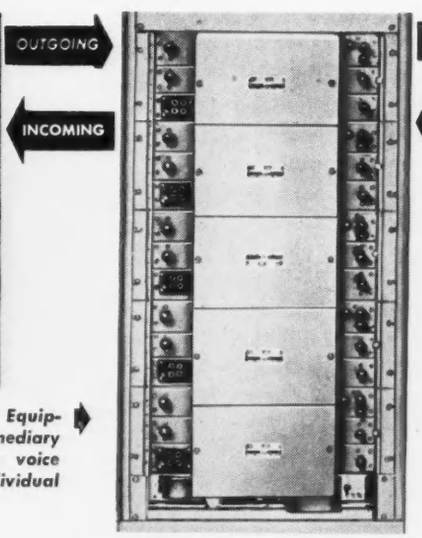
Microwave employs the same general principles, using "a pole-line in the sky." Voice channels are transmitted on the line-of-sight radio beam. Free from the crippling effects of ice, wind, or accident, radio relay carries the message over mountains, water, desert or swamps. Strategically located towers mount the reflectors for transmitting and receiving; on long runs, repeaters pick up the radio signal, amplify and relay it on to the next tower or terminal.

Many Different Uses. While the principle usage is to establish multichannel point-to-point telephone service, Microwave offers additional possibilities for telephone company use. Mobile communication for company trucks may be established to any tower. A wire-line leg or radio-relay link may be dropped off to isolated plants, small communities or military establishments. Microwave may be used to carry signaling circuits, in addition to voice channels, used for control purposes at unattended power or pumping stations and the like. Microwave is already proving in for some Independents; however the multitude of applications in the telephone field is just beginning to be explored.

Equipment Used. Stromberg-Carlson Microwave Systems are designed expressly for telephone use.

How Microwave Works

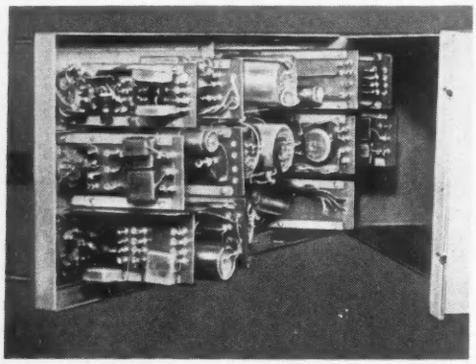
TOLL BOARD and toll trunks operate as if you were using wire-line carrier. (Each step shown here handles both incoming and outgoing calls.)



SETCO Multiplex Equipment is the intermediary step, stacking the voice channels in individual frequency bands.

RADIO-RELAY equipment takes the multiplex signal, changes it to high frequency, and sends it out as a "line-of-sight" Microwave beam. At the opposite end of the beam is similar equipment to convert the signal back to audio frequencies and complete the call.

STROMBERG-CARLSON transmitter



SETCO Multiplexing equipment is gate-mounted and constructed in the building block pattern for standardization.

The central exchange operates in the same manner as in all-wire telephone systems. Connections to the Microwave system may be made from XY Dial, other dial, or manual offices.

SETCO multiplexing (channeling) equipment provides the link between the central office and the radio-relay portion of the system. The multiplexing units, designed and manufactured by the SETCO Division of Stromberg-Carlson, are of the building block type so that voice channels may be added or moved as required. Voice channeling units are gate-mounted so that both sides are easily visible from the front for routine checking.

The radio-relay portion of the system is manufactured by RCA—recognized leader in the field of electronics communication for the last 25 years. This radio-relay equipment makes optimum use of the frequency spectrum — a vital consideration from the point of view of obsolescence. The design of the system shortens installation time; less critical alignment means that towers do not have to be so rigid and therefore can be erected more economically.

Installation and Maintenance. Stromberg-Carlson, through its branch offices, provides the original engineering and installation and also offers maintenance and service by factory-trained technicians on a contractual or emergency basis. A replacement parts plan assures speedy delivery from nearby centers.

* * *

The Stromberg-Carlson Telephone Microwave System is described in a new book which will be sent to interested telephone managers on request. Ask for bulletin T-132.

XY Systems Sprout Forth in the Evergreen State

Rainier Welcomes XY And 200th Telephone

Growth seems to be chronic in the great state of Washington. And with growing industry and population, comes the need for modern telephony.

To meet the needs of his community, Homer Christensen and his Rainier Telephone Company cut over from magneto to Stromberg-Carlson XY Dial, on November 14, 1953.

This was accompanied by another milestone — installation of the 200th telephone, a spanking new Stromberg-Carlson "1500" series telephone bearing a bronze plate commemorating the occasion.

Subscribers and friends from Rainier and neighboring Vail, also served by the new XY System, flocked to President Christensen's open house in the new exchange building, to inspect the equipment and pay tribute to the man who built up the company from 84 terminals in 1947 to more than double that number, in just six years.

Homer G. Christensen (r) and his wife are joined by Stromberg-Carlson's Fred McGrady, at Rainier's XY cutover celebration.

Roaring Winds and Angry Seas Fail to Spoil Long Beach's XY Cutover

Like a warning finger, Long Beach Peninsula juts into the Pacific, just north of the Columbia River mouth.

On the map, the finger seems to be gesturing "shh!" to the sea, but the sea can't read maps. It slashed and boiled, and brought 50- to 70-mile-an-hour winds with it, apparently in a mighty attempt to ruin Ilwaco Telephone and Telegraph Company's spanking new XY Dial operation.

It didn't. When the storm hit, just one day after the cutover on January 24, men and equipment rose to the challenge and the 900 subscribers enjoyed unbroken service.

The raging storm snapped the roof off a fishery, scattered trees like jackstraws, sunk a boat offshore, and knocked out electrical service for 44 hours.

To meet the emergency, President Norman A. Howerton called upon the company's batteries and a portable charger generously loaned by the Pacific Telephone Company, to keep the XY System in operation. Dial tones were temporarily eliminated, as an emergency measure to save power.

The novelty of dial operation, plus the outage of electrical power, created an unusually heavy load on the system, but the XY equipment met the situation and provided uninterrupted service.

Key figures in the cutover were Mr. Howerton (who is also Mayor of Ilwaco), Harry E. Morgan, an important stockholder; Mayor Ted Lentz of Long Beach; and technicians Paul Wenstrom and Reggie Stewart. Stromberg-Carlson participants: Fred McGrady, sales representative; Gil Chesterton, in charge of installation.

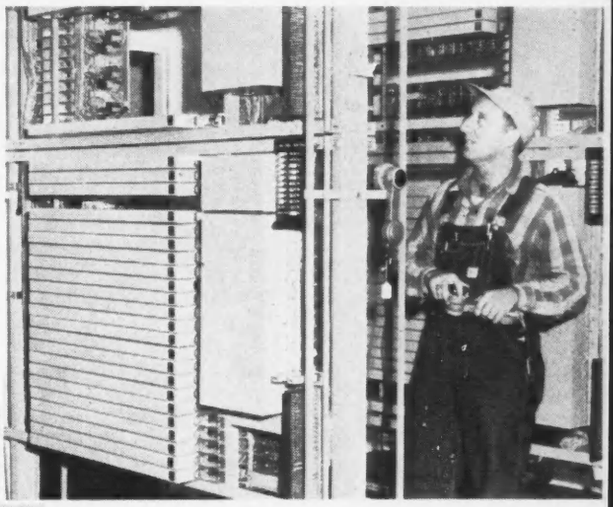
STROMBERG-CARLSON transmitter

"As Quiet as Corn Growing" at New Baden (Ill.) XY Exchange

Oscar Krick, manager of the Looking Glass Prairie Telephone Co., has moved another big step forward in his dial program. Fayetteville has been XY for some time, the main office at Mascoutah is nearly ready for conversion; New Baden has recently come to enjoy the latest in modern dial operation.

Located just across the Mississippi from St. Louis, the 50-year old utility managed by Mr. Krick has been confronted with what has become a typical situation: obsolescence of manual equipment coupled with a growth which could only be met by a major replacement of central office facilities. Many in a similar situation would have thrown in the towel — not Mr. Krick.

After careful study of the needs and the potential of the area, long range plans were drawn up, financial assistance was obtained through the Stromberg-Carlson Credit Corp., and the system is being rebuilt exchange by exchange. With the total program well beyond the half-way mark, Oscar Krick can already see the result of this hard work bearing fruit.



Melvin Frerking, lineman, performs last minute tests prior to cut-over at New Baden.

Oscar Krick, manager, dials up the exchange from one of the new residence telephones. Belleville News-Democrat Photos.

Mr. Krick is experiencing the common aftermath of installing an XY System: his subscribers are most enthusiastic and many who delayed placing orders for services are now requesting lines.

Like the good people who live in his territory now served by XY, we say, "Congratulations, Mr. Krick, on the good work done so far." We'll visit you again at Mascoutah in the near future.

Dexterous Hands, Expertly Trained, Fashion Reliability into XY

Mary Cannioto carefully adjusts the XY Switch spring pile-up to rigidly maintained specifications.

Behind these girls shown assembling the XY Switch are row after row of test booths for putting the apparatus through critical electrical and mechanical tests.

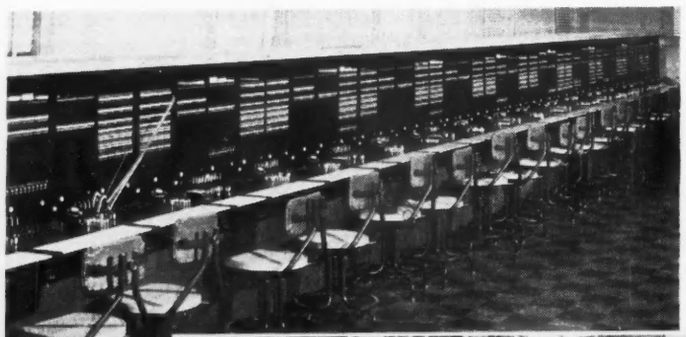
These girls' hands are not insured for fabulous sums like the concert violinist or piano virtuoso. But, like these same musicians, it takes long, patient training to give them the required skills to fashion a precision instrument such as the XY Switch.

The desire to increase production of these switches to meet stepped-up demand for XY Systems must always be tempered by the necessity for building into the mechanism the performance standards that signify dependability. Those who will be counting on their XY exchanges to give 24-hour service, year after year, will understand why speed plays second fiddle to thoroughness. A minor delay today protects an investment for a lifetime.

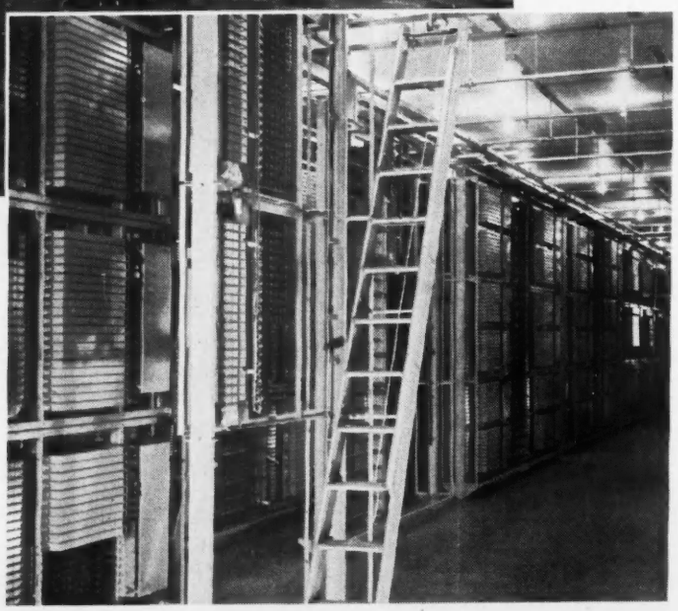
STROMBERG-CARLSON transmitter

Inter-Mountain Telephone Company Sets Pace in Tennessee

L. to r. (bottom row): E. T. Ferguson, Geo. Masak, W. L. Mollands and J. G. Hagen, all of Stromberg-Carlson; A. E. Reynolds, General Commercial Superintendent, Inter-Mountain. L. to r. (top row): T. C. Thompson and W. M. Angle, both of Stromberg-Carlson; W. H. Mansfield, Vice-President and Secretary, Southern Bell; John D. Wilson, Manager, Kingsport exchange; J. H. Voss, Stromberg-Carlson; John E. Saxton, Vice-President, Inter-Mountain; and R. C. Lake, Stromberg-Carlson.



24 position No. 3 toll board, equipped for nationwide intertoll dialing, the first in Tennessee.



14,000 terminals of XY Equipment in spacious central office at Kingsport, Tennessee.

Kingsport, Tennessee, has surprised even the Chamber of Commerce! A combination of good business management, cheap power, excellent climate and recreational facilities have drawn people to this city in ever increasing numbers. In the forefront of business leadership is the Inter-Mountain Telephone Company, with headquarters in nearby Bristol.

Kingsport has the type of business and residents that expect the best in telephone service — the kind being supplied by Mr. Kelley McNish, general manager, and Mr. John Wilson, local manager. Some statistics of the Tri-Cities (Kingsport, Bristol and Johnson City) support this statement. Population of the three cities alone (1950) was over 80,000; the total retail sales bettered $145 million. In Kingsport there were some 625 dwelling units in 1920; over 5,600 in 1950, with the majority of such homes built in the last eighteen years. Manufacturing in Kingsport boasts an amazing record: 24 establishments employ 9,254 people, with an aggregate income of $24 million. Total value added by manufacture in these industrial plants is an astounding $49 million.

Figures are only useful as they illustrate a point. The Inter-Mountain Telephone Company area is already booming. Such progress calls for large plans, carefully prepared and skillfully executed.

Mr. McNish and his management group have approached the task with vision, for as they look ahead they foresee a continuation of this growth pattern. In converting the 14,000 terminal Kingsport office to XY Dial, they have assured highest grade service for the present and the future.

Nationwide Inter-Toll Dialing, the first in Tennessee, was put into effect simultaneously with the dial conversion. The 24 position No. 3 Toll Board is equipped for keysender operation.

Representatives of the state Public Utilities Commission and prominent telephone executives from neighboring cities were guests of Mr. McNish at a buffet.

STROMBERG-CARLSON transmitter

The Physical Testing Laboratory

How do you know that your Stromberg-Carlson equipment is uniform in quality, will stand up under rugged treatment? Who makes up the rules for Stromberg-Carlson quality? How are they enforced?

General office area used for preparing reports.

AROUND the turn of the century, Mr. Stromberg could pick up his latest handset, bang it on the floor without breaking it, and tell Mr. Carlson, "Androv, this is the most unbreakable telephone on the market!"

And it was!

But today, we use a more scientific approach to make certain your Stromberg-Carlson telephones, XY components and other equipment are at the head of the quality parade.

Bridges and frequency measuring area.

In the Physical Testing Department trained specialists continually test such components as coils, transformers, capacitors, resistors, relays, wire, XY switches, and iron cores. Thus you are assured the most recent type of tests and equipment.

The rules for testing are not always written by Stromberg-Carlson. Specifications of the Armed Forces, RETMA, ASTM, Underwriters' Laboratories, and other impartial experts must often be met — or surpassed. And when nobody *else* has established the standard, our own testing and engineering people get their heads together and try to make it tough for themselves.

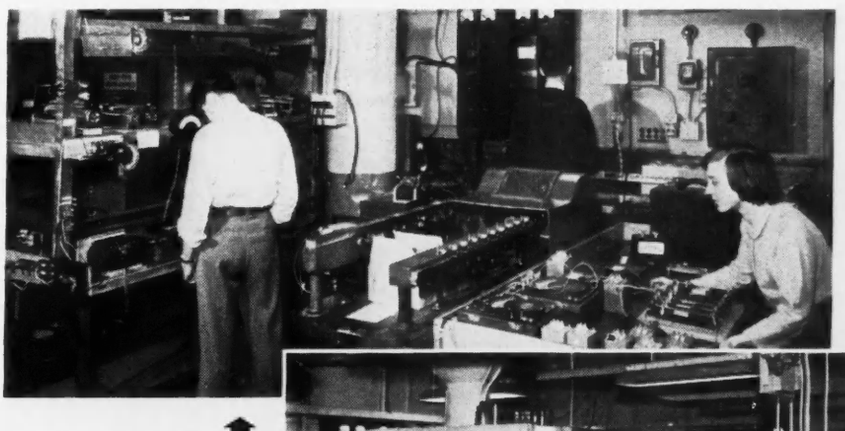
To do this, the Physical Testing Laboratory in Rochester is equipped with complete, up-to-date facilities for checking your equipment.

With every necessary instrument from a 27-cubic-foot climate chamber to high speed photographic equipment for checking reversal speed of miniature motors, test engineers handle electronics, mechanical, environmental, climatic, metallurgical and many other types of tests.

At the helm of the Physical Testing Laboratory is C. W. Clemens. Commanding the "field forces" are two technical supervisors: F. E. Dailor and L. K. Ulrich.

Under their capable guidance, your telephone equipment is tested to deliver all the long life and accurate service you expect of it. And you can expect plenty!

Humidity, high and low temperature chambers.



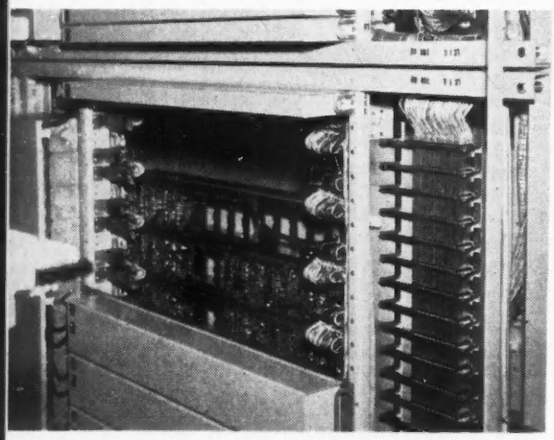
Motor and transformer test equipment; D.C. power panels; rotational life test equipment shown above.

Vibration table; high altitude test equipment; 20-million Megohmometer.

STROMBERG-CARLSON transmitter

Minnesota Co-operative Welcomes New XY System With Open House Parties for Subscribers

When the Gardonville, (Minn) Co-operative Telephone Association completed cutover of its new XY Dial system in January a celebration was in order.



So a week-long roving party began, with open house at each of the company's plants in succession. Starting at Millersville, the open houses moved on to Melby, Evansville, Erdahl and Garfield, winding up on Saturday at the central office in Brandon.

Paul Ekstrand

The company's 830 dial subscribers flocked to these open houses to see the new XY equipment that was giving them such wonderful service.

Part of XY equipment in Gardonville Co-op Telephone Ass'n building at Brandon, Minnesota.

Paul Ekstrand, manager of the telephone company, was the happy host that week, and beamed proudly as he pointed out features of his smoothly purring equipment.

Also instrumental in bringing XY to these Minnesota towns was Carl Erickson, who was manager from 1946 to 1949, and laid the groundwork for the improvement program. From January 1949 to May 1949, Harold G. Johnson carried on, before turning the program over to the company's present manager.

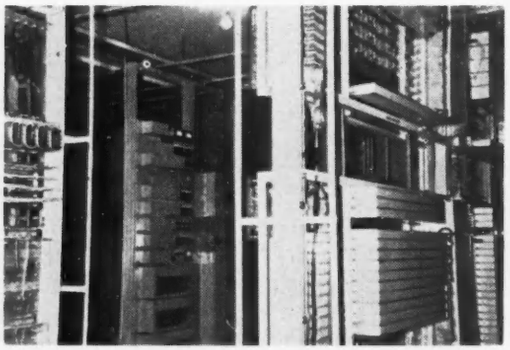
Besides the modern new central exchange building in Brandon, the dial equipment is housed in neat unattended stations in each of the other towns.

Southwestern States Telephone Company Cuts in XY System at Corning, Arkansas

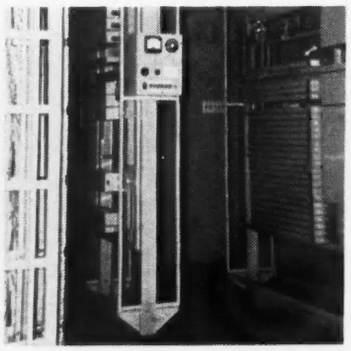
Running as smoothly as a water wheel, the XY cutover of the Corning, Arkansas exchange (Southwestern States Telephone Co.) brought modern dial service to 610 subscribers.

The local newspaper editor pulled the tapes . . . the mayor made the first long distance call, and Manager T. B. Hollings of the Arkansas Division joined other dignitaries in celebration.

Present at the cutover were Lindsay F. Baker, Stuttgart manager; Sam Cowley, Arkansas Division maintenance supervisor; Garnett Keithley, Division installer; James Lancaster, Stuttgart switchman; Tommy De Hay, assistant equipment engineer (Brownwood); Jack James, Station installer (Brownwood); F. J. Micka, Stromberg-Carlson sales representative; Joe Pringle, installer.



Bays of Stromberg-Carlson XY equipment in Corning, Arkansas exchange. 610 stations are served by this system.



Cutover to XY went smoothly. The town council commented favorably on the uncanny swiftness of dial.

Joe Pringle, Stromberg-Carlson installer, makes last-minute adjustment.

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327 Fifth Avenue, Pittsburgh 22, Pa.

THE BACK OF THE BOOK

BY JOHN G. REYNOLDS

"New Number Wanted! !"

NOW HAROLD CHAVIS of Lakewood. Wash., wishes he hadn't had that telephone put in. Chavis, a restaurant owner, applied for the telephone a couple of weeks ago. Much to his surprise, the telephone company put one in right away.

That's when the fun began.

The telephone started ringing and it rang constantly.

Chavis and his wife always got the same request from callers: *"May I speak to Ed Eisenhower, please."*

Mrs. Chavis answered upwards of a dozen calls before the light dawned.

"Do you realize that we got a telephone right away," she asked Chavis, "And yet the telephone company said it would be six months before we could get one installed."

"Fast service and influence," Chavis replied.

"Nope, we got Ed Eisenhower's telephone number," Mrs. Chavis told her husband. "We got the one he gave up because it was too hot for him to handle."

And she was right.

Edgar N. Eisenhower, the President's brother, begged the telephone company to give him a new — and unlisted — number to keep his telephone from ringing constantly.

When Chavis first got Eisenhower's discarded number the calls came in by the dozens. Then they came in by the gross.

To top it off, callers wouldn't believe Chavis when he told them they had the wrong number. They just called back.

"Apparently there is a rule that you don't call the President's brother before midnight. About 3 a.m. would be about the right time," Chavis moans.

"They call for influence to get them appointments. And they get sore when I tell them they have the wrong number. The crackpots call when the bars are closing. They insist that I get Ed right now."

Now and then Chavis turns the tables on callers and has a little fun for himself.

"They're both here," Chavis quipped into the telephone. "Which one do you want, Ed or Ike?"

The caller, taken aback by the quick answer, did what Chavis wishes they would all do.

He hung up.

"Discussion Ended!"

WHILE THE *Readers' Digest* is widely read, perhaps you missed this report from a prisoner of war camp in Korea.

Acording to *Long Lines*, a Chinese Communist was lecturing on "maltreatment of labor in the United States." In the Soviet Union and the People's Republic of China, he said, it was the competent worker rather than the management official who was honored and elevated. He called on an American sergeant to make appropriate comments.

"Well, I don't know," said the sergeant, stroking his chin. "At home I work for the Telephone Company. All the big men in it came up from the ranks — linemen and such. Seems to me that they're the Labor Heroes. Happens that I'm a stockholder in the company. It pays good money. Don't see that I've got any complaints."

The topic of labor was never touched again in that particular class.

Tin-Can Telephone System

RUMORS TELL US that a tin can telephone system is providing communications for Malay villages in five areas in Kelantan state, north Malaya.

The Telecommunications Department in Malaya disclosed existence of the telephones in a warning issued to the villagers to have them dismantled as wires from their telephone networks were interfering with regular government lines whenever they fell across them.

The Department said in a statement it "applauds the initiative of the people" and promised to fix up a field telephone system for them.

The tin-can telephone system consists of two cans. One end of each can is cut out and through the other end a hole is made.

The ends of a length of wire, linking two villages, are attached to the cans through the holes. The open end of the can is the mouthpiece as well as the earpiece of the telephone. As one speaker talks into th open end the listener at the other end has the open end to his ear.

The Answer Is YES!

WESTERN UNION

1201

DL=Day Letter
NL=Night Letter
LT=Int'l Letter Telegram
VLT=Int'l Victory Ltr.

CTA136

.LRA178 NL PD=LORAIN OHIO 10=
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YES, A THREE-PHASE FLOTROL WILL OPERATE IN PARALLEL WITH A MOTOR-GENERATOR SET. FURTHERMORE, IT WILL REGULATE THE CURRENT AND VOLTAGE OUTPUT OF THE GENERATOR. ORDER FLOTROL EQUIPPED WITH RESISTOR FOR PARALLELING WITH GENERATOR=

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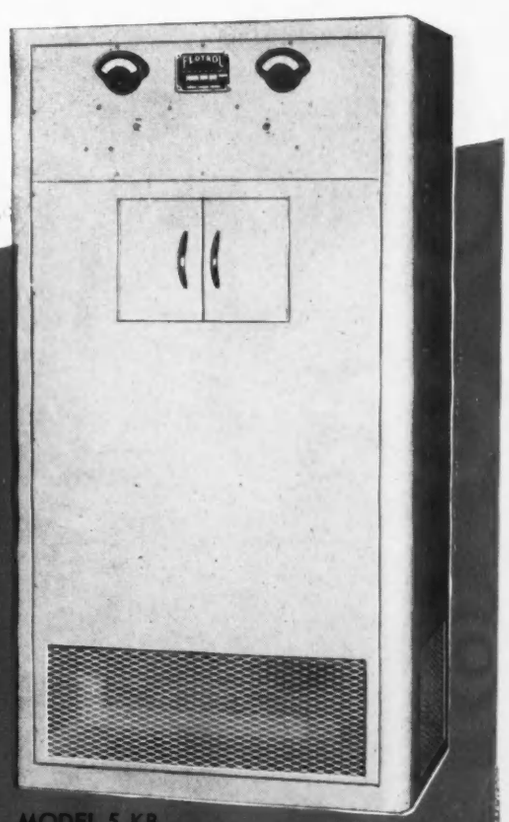

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Now tried and proven, the combination of a FLOTROL with a motor-generator type battery charger may be the answer to your problem, too. By adding the proper three-phase FLOTROL to your exchange, you can maintain full-floating operation 24 hours daily, cut down the running time on your rotary equipment, provide adequate stand-by capacity, and realize sizeable savings on your monthly power bills. The equalizing feature installed in the FLOTROL will regulate the output voltage of your DC generator to the precise standard set by the FLOTROL and will divide the load current between the FLOTROL and the generator in proportion to their ratings.

For complete information write for Bulletin 161 listing three-phase FLOTROLS from 25 amp. to 200 amp. Single-phase FLOTROLS ranging from 1 amp to 24 amp. are listed in Bulletin 160.

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NUMBER ~~TWO~~ OF A SERIES

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As a result of our 20 years experience in the field of directory publication for the independent telephone industry, *we know* that many companies are satisfying themselves with less net profit than they should expect from their telephone directories.

Making money for you is our business. We have substantially increased net profits from directory operations for company after company. We accomplish this by expert and efficient handling of every phase of publication—from sales to printing. We provide more accurate, more attractive directories which supply the telephone companies we serve with the additional revenue they need to establish reserves.

For your company, the first step toward building adequate reserves from directory operations to meet the demands of the future is a realistic evaluation of your directory's true potential. Our experienced representative will be pleased to make this detailed study for you with no cost or obligation. Call today.

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